US Sanction Paper

Title:	Primavera Upgrade/Stabilization	**Sanction Paper #:**	USSC-19-004
Project #:	INVP 4990 Capex: S008000	**Sanction Type:**	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	1/8/2019
Author:	Yelena Belousova	**Sponsor:**	Trisha Brabbs, VP Project Controls & Estimating
Utility Service:	IT	**Project Manager:**	Elizabeth Rosa/Michael Cowan

1 Executive Summary

1.1 *Sanctioning Summary*

This paper requests partial sanction of INVP 4990 in the amount of $0.816M with a tolerance of +/- 10% for the purposes of Requirements and Design.

This sanction amount is $0.816M broken down into:

$0.440M Capex
$0.376M Opex
$0.00M Removal

NOTE the potential investment of $4.038M with a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of Requirements and Design.

1.2 *Project Summary*

Primavera P6 (Primavera P6 Project Management and Analytics modules) is the project portfolio management software used in the US by gas and electric business units. It is a ten-year-old software, slow, does not have a user-friendly user interface, or provide web based functionality, and has very limited functionality for project risk management. Gas and electric business units have been negatively affected due to the issues arising from instability of the outdated Primavera P6 infrastructure environment. This investment will perform migration of the Primavera P6 Project Management and Primavera P6 Analytics modules to the latest software version on new, high availability cloud infrastructure.

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1.3 *Summary of Projects*

Project Number	Project Type (Elec only)	Project Title	Estimate Amount ($M)
INVP 4990		Primavera Upgrade/Stabilization	4.038
		Total	4.038

1.4 *Associated Projects*

N/A

1.5 *Prior Sanctioning History*

N/A

1.6 *Next Planned Sanction Review*

Date (Month/Year)	Purpose of Sanction Review
May 2019	Project Sanction

1.7 *Category*

Category	Reference to Mandate, Policy, NPV, or Other
○ Mandatory ◉ Policy- Driven ○ Justified NPV ○ Other	National Grid Standards, IT standard 'RUN: Operate and Maintain', 3.3 - Adhere to the defined asset management lifecycle policy and usage policies for IT assets to which the policies apply.

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1.8 *Asset Management Risk Score*

Asset Management Risk Score: ___45__

Primary Risk Score Driver: (Policy Driven Projects Only)

◉ Reliability ○ Environment ○ Health & Safety ○ Not Policy Driven

1.9 *Complexity Level*

○ High Complexity ○ Medium Complexity ◉ Low Complexity ○ N/A

Complexity Score: __16___

1.10 *Process Hazard Assessment*

A Process Hazard Assessment (PHA) is required for this project:

○ Yes ◉ No

1.11 *Business Plan*

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan ($)
IT Investment Plan FY19 - 23	○ Yes ◉ No	◉ Over ○ Under ○ NA	$4.038M

1.12 *If cost > approved Business Plan how will this be funded?*

Re-allocation of budget within the IT business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

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1.13 *Current Planning Horizon*

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.046	2.800	0.000	0.000	0.000	0.000	2.846
OpEx	0.000	0.176	1.004	0.000	0.000	0.000	0.000	1.180
Removal	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.012
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.222	3.816	0.000	0.000	0.000	0.000	4.038

1.14 *Key Milestones*

Milestone	**Target Date: (Month Year)**
Start Up	November 2018
Partial Sanction	January 2019
Begin Requirements and Design	January 2019
Project Sanction	May 2019
Begin Development and Implementation	June 2019
Begin User Acceptance Testing	December 2019
Move to Production / Last Go Live	February 2020
Project Closure	May 2020

1.15 *Resources, Operations and Procurement*

Resource Sourcing			
Engineering & Design Resources to be provided	☑ Internal	☐ Contractor	
Construction/Implementation Resources to be provided	☑ Internal	☑ Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	○ Red	○ Amber	◉ Green
Availability of external resources to deliver project:	○ Red	○ Amber	◉ Green
Operational Impact			

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Outage impact on network system:	○ Red	○ Amber	◉ Green
Procurement Impact			
Procurement impact on network system:	○ Red	○ Amber	◉ Green

1.16 *Key Issues (include mitigation of Red or Amber Resources)*

There are no significant business issues beyond what has been described elsewhere.

1.17 *Climate Change*

Contribution to National Grid's 2050 80% emissions reduction target:	◉ Neutral	○ Positive	○ Negative
Impact on adaptability of network for future climate change:	◉ Neutral	○ Positive	○ Negative

1.18 *List References*

N/A

2 Decisions

I:

(a) APPROVE this paper and the investment of $0.816M and a tolerance of +/-10% for the purposes of requirements and design.

(b) NOTE the potential run-the-business (RTB) impact of $1.381M total for 5 years.

(c) NOTE the potential investment $4.038M and a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of requirements and design.

(d) NOTE that Michael Cowan is the Project Manager and has the approved financial delegation to undertake the activities stated in (a).

Signature……..Date…….

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair

3 Sanction Paper Detail

Title:	Primavera Upgrade/Stabilization	**Sanction Paper #:**	USSC-19-004
Project #:	INVP 4990 Capex: S008000	**Sanction Type:**	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	1/8/2019
Author:	Yelena Belousova	**Sponsor:**	Trisha Brabbs, VP Project Controls & Estimating
Utility Service:	IT	**Project Manager:**	Elizabeth Rosa/Michael Cowan

3.1 *Background*

Improving National Gird's ability to deliver major US gas and electric capital projects on time, within budget, and at a lower cost is the main element of the company's Shaping Our Future strategy.

Primavera P6 application is a key tool utilized across Electric Resource Planning, Long Island Generation (Outage Management) and Capital Delivery to assist with the management and delivery of the gas and electric Capital Program of works for National Grid US.

Primavera P6 Project Management and Analytics modules are used to assist in planning, scheduling, and forecasting activities for capital projects.

Gas and electric business units have been negatively affected due to the issues arising from:

- Outdated version of the Primavera P6 software:
  - In the US, a ten-year-old version of Primavera P6 is being used - Primavera P6 v.7.0, which is nine major releases behind.
  - With limited vendor (Oracle) support that doesn't cover any bug fixes or needed changes.
  - Slow, does not have a user-friendly user interface, or web based functionality
  - Provides very limited functionality for project risk management and timely edits to the project schedule and forecast information.
- Unstable and outdated Primavera P6 infrastructure environment:
  - Multiple major service interruption incidents have occurred within the last 3 years.
  - Primavera P6 is running on the same server as several other applications and thus impacting other critical business applications performance.

The Primavera P6 upgrade effort was recently completed in National Grid UK to benefit UK Capital Delivery line of business. This project will be reusing, as applicable, UK Primavera P6 design, implementation approach, and lessons learned. This investment's solution is aligned with the UK Primavera P6 deployment model.

This investment will perform migration of the Primavera P6 Project Management and Analytics modules to the latest software version on new, out-of-the-box, easily scalable, high availability cloud infrastructure.

3.2 *Drivers*

The main drivers are:

- Improve complex capital project management capabilities by delivering complex capital projects at a lower cost, on time and within budget.
- Improve stability and reliability of Primavera P6 application by moving from the outdated and unstable software and hardware to the latest software version and on new, high availability cloud infrastructure.

3.3 *Project Description*

During the Requirements and Design phase of the project, the following will be accomplished:

- Document Business and Technical Requirements
- Document Key Business Issues, Pain Points, and Challenges
- Create Business Requirements Document
- Document Key Capabilities Required
- Conduct Current State Technical and Functional Assessment
- Engage Oracle Primavera Services Group for professional services
- Develop Solution Design
- Develop Solution Hosting Design
- Develop Integration Solution Design
- Document decommissioning process for current version of the Primavera P6 software
- Complete new Primavera P6 Software procurement and provision of product licenses and support required
- Develop a detailed implementation plan

The project team will be comprised of IT Solution Delivery and Solution Delivery Center partners, the Projects Management, Project Controls and Estimating, Electric Resource Planning and Long Island Generation (Outage Management) business resources,

Systems Integrator resources and the 3rd party Oracle Primavera Services Group vendor resources. The project will use a hybrid delivery approach of waterfall (a linear approach to complete the tasks in the following sequence: requirements definition, solution design and planning) and agile methodology (rapid delivery for testing and solution implementation in complete functional components).

3.4 *Benefits Summary*

This investment will facilitate US gas and electric business units' ability to achieve enabling of the 20% improvement in National Gird Capex performance by providing the following benefits:

- The upgraded Primavera P6 version will provide a significant expansion in functionality for complex capital project planning, scheduling, and forecasting activities including risk management and new web-enabled / mobile capabilities, and therefore, it will increase visibility on and enable better decision making of complex capital project risks, associated costs, and forecast accuracy, so projects can be managed more effectively.
- The upgraded Primavera P6 version capabilities will enable the business to answer regulatory entities queries in a timely manner, with more accurate complex capital project cost and schedule data, and therefore:
    - Reduce negative impacts to customers
    - Avoid penalties for under performance
    - Increase credibility with regulators
    - Improve regulatory filing outcomes based on an improved, on time, on budget delivery of complex capital delivery projects.

3.5 *Business and Customer Issues*

There are no significant business issues beyond what has been described elsewhere.

3.6 *Alternatives*

Alternative 1: Upgrade of Primavera P6 to Latest Software Version with Existing On-Premises Server Infrastructure

Rejected:

- Business will continue to be negatively impacted by the outdated and unstable infrastructure environment.
- It will jeopardize US gas and electric business units' ability to achieve enabling of the 20% improvement in National Gird Capex performance by delivering complex capital projects fit for the purpose at a lower unit cost, on time and within budget.

- The new, upgraded version of the Primavera P6 software will not be compatible with the existing underlying infrastructure operating system and database version.
- Operating system and database upgrade can cause compatibility issues with other applications sharing the infrastructure environment with Primavera P6.

Alternative 2: Migrate Primavera P6 to Latest Software Version with New On-Premises Server Infrastructure

Rejected:

- New on-premises server infrastructure implementation and maintenance will be costlier and more time-consuming in comparison with the cloud infrastructure.
- New on-premises server infrastructure will present scalability challenges related to the speed of hardware provisioning to address future capacity requirements.
- The future infrastructure and Primavera P6 upgrade processes will be more complex and therefore costlier and more time-consuming.
- Integration with Oracle Unifier will be more complex and time and cost consuming.
- Delivery of important business requirements for this project will be technically impossible. For example, consolidated reporting with Oracle Unifier.

Alternative 3: Do Nothing/Defer Project

Rejected:

- Business will continue to be negatively impacted by:
  - Issues related to the outdated and only partially vendor supported Primavera P6 software and unstable infrastructure environment.
  - Unaddressed Primavera P6 capability gaps in capital project planning, scheduling, and forecasting management.
- It will jeopardize US gas and electric business units' ability to achieve enabling of the 20% improvement in National Gird Capex performance by delivering complex capital projects fit for the purpose at a lower unit cost, on time and within budget.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant issues beyond what has been described elsewhere.

3.8 *Execution Risk Appraisal*

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	If there are any changes to the scope or expected complexity of the interfaces planned, it could increase both the cost and schedule of the project.	3	3	3	9	9	Mitigate	The Project Manager and business analyst will work with the business to document detailed requirements as quickly as possible and confirm the scope of the integrations.	Changes later in the project could result in changes in scope or complexity that could negatively affect the cost or schedule.	The Project Manager will continue to work with the business to control scope and maintain the budget and schedule.
2	If any customizations are found in the existing P6 environment that were not known at the time this project was estimated, it could impact both the cost and schedule.	3	5	3	15	9	Accept	The Project Manager and solution architect will work with the vendor to fully understand and map any variances up front, so that they may be accounted for in the design phase.	Inability to meet business expectations and deliver the upgrade on schedule.	The Project Manager will work with the vendor to address any issues quickly.
3	If the old P5 database needs to be upgraded and re-archived, this could add significant complexity and cost to this project.	3	3	3	9	9	Mitigate	The Project Manager will work with the business to determine the most economical option for the P5 database.	Inability to meet business expectations and deliver the upgrade on schedule.	The Project Manager will work with the Solution Architect to identify alternatives that are cost-effective, with minimal impact on the schedule.

3.9 *Permitting*

N/A

3.10 *Investment Recovery*

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 *Financial Impact to National Grid*

3.11.1 Cost Summary Table

					Current Planning Horizon						
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
Project Number	Project Title	Project Estimate Level (%)	Spend ($M	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
INVP 4990	Primavera Upgrade/Stabilization	+/-25%	CapEx	0.000	0.046	2.800	0.000	0.000	0.000	0.000	2.846
			OpEx	0.000	0.176	1.004	0.000	0.000	0.000	0.000	1.180
			Removal	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.012
			Total	0.000	0.222	3.816	0.000	0.000	0.000	0.000	4.038
Total Project Sanction			CapEx	0.000	0.046	2.800	0.000	0.000	0.000	0.000	2.846
			OpEx	0.000	0.176	1.004	0.000	0.000	0.000	0.000	1.180
			Removal	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.012
			Total	0.000	0.222	3.816	0.000	0.000	0.000	0.000	4.038

3.11.2 Project Budget Summary Table

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Project Costs per Business Plan

		Current Planning Horizon						
	Prior	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Variance (Business Plan-Project Estimate)

		Current Planning Horizon						
	Prior	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	(0.046)	(2.800)	0.000	0.000	0.000	0.000	(2.846)
OpEx	0.000	(0.176)	(1.004)	0.000	0.000	0.000	0.000	(1.180)
Removal	0.000	0.000	(0.012)	0.000	0.000	0.000	0.000	(0.012)
Total Cost in Bus. Plan	0.000	(0.222)	(3.816)	0.000	0.000	0.000	0.000	(4.038)

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the Standard IT Estimating Methodology which includes an assessment of project resource needs. Examples of these resource needs include hardware, software, internal and contract labor required to deliver the project. The accuracy level of estimate for each project is identified in Table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 *NPV Summary Table*

N/A

3.11.4.2 *NPV Assumptions and Calculations*

This is not an NPV project.

3.11.5 Additional Impacts

N/A

3.12 *Statements of Support*

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Marc Quesnel	CDI Business Representative
Business Department	Matthew Barnett	Electric Resource Planning Business Representative
Business Department	Debra Le Posa	Long Island Generation (Outage Management) Business Representative
Program Delivery Management (PDM)	Sally Seltzer	Head of PDM
Business Partner (BP)	Premjith Singh	Relationship Manager
Program Delivery Management (PDM)	Michael Cowan	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Daniel DeMauro	Director
Digital Risk and Security (DR&S)	Peter Shattuck	Director
Service Delivery	Marc Mirizio	Manager
Enterprise Architecture	Svetlana Lyba	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 *Sanction Request Breakdown by Project*

N/A

4.2 *Other Appendices*

4.2.1 Project Cost Breakdown

Project Cost Breakdown $ (millions)					
Cost Category	**sub-category**	**Value of Work to Date (VOWD)**	**Forecast to Complete (FTC)**	**Forecast At Completion (FAC=VOWD+FTC)**	**Name of Firm(s) providing resources**
Personnel	NG Resources		0.453	0.453	
	SDC Time & Materials		0.250	0.250	IBM
			0.430	0.430	WiPro
			0.006	0.006	DXC
			0.115	0.115	Verizon
	SDC Fixed-Price		-	-	IBM
			-	-	WiPro
			-	-	DXC
			-	-	Verizon
	All other personnel		1.800	1.800	Oracle,Centric Consulting, Cleartelligence
	TOTAL Personnel Costs	**-**	**3.055**	**3.055**	
Hardware	Purchase		-	-	
	Lease		-	-	
Software			0.435	0.435	
Risk Margin			0.354	0.354	
AFUDC			0.107	0.107	
Other			0.088	0.088	Shared Overhead, Travel & Expense costs, Penetration Testing
TOTAL Costs		-	4.038	4.038	

4.2.2 Benefiting Operating Companies

Operating Company Name	Business Area	State
Keyspan Energy Delivery - NY	Gas Distribution	NY
Keyspan Energy Delivery - LI	Gas Distribution	NY
Niagara Mohawk Power Corp	Electric Distribution	NY

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Niagara Mohawk Power Corp - Gas	Gas Distribution	NY
Niagara Mohawk Power Corp - transmission	Transmission	NY
Massachusetts Electric Company	Electric Distribution	MA
Massachusetts Electric Company - transmission	Electric Transmission	MA
Nantucket Electric Company	Electric Distribution	MA
Boston Gas Company	Gas Distribution	MA
Colonial Gas Company	Gas Distribution	MA
Narragansett Gas Company	Gas Distribution	RI
Narragansett Electric Company	Electric Distribution	RI
Narragansett Electric Company - transmission	Transmission	RI
New England Power Company - transmission	Transmission	RI

4.2.3 IS Ongoing Operational Costs (RTB):

This project will increase IT ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

The reasons for RTB increase are:

- Annual licensing costs for SaaS (cloud) solution are higher than the prior on-premises support costs.
- Project cannot decommission the hardware because it is shared with other applications.
- Project will increase the integrations points for Primavera P6, due to new functionality in the new software version.

All figures in $ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB						-
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB						-
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	**(209.7)**	**397.0**	**397.5**	**398.0**	**398.5**	**1,381.4**
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	209.7	(397.0)	(397.5)	(398.0)	(398.5)	(1,381.4)
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-

Closure Paper

Title:	DG IOAP Phase 2 Screens A & B	**Sanction Paper #:**	
Project #:	INVP 5023	**Sanction Type:**	Closure
Operating Company:	Niagara Mohawk Power Corp.	**Date of Request:**	12/21/2018
Author:	Jatinder P. Singh	**Sponsor:**	Carol Sedewitz, VP Electric Asset Management
Utility Service:	IS	**Project Manager:**	Jatinder P. Singh

1 Executive Summary

This paper is presented to close INVP 5023 DG IOAP Phase 2 Screens A & B project. The total spend was $0.339M. The original sanctioned amount for this project was $0.406M at +/- 10%.

2 Project Summary

The purpose of this project was to automate New York Interconnection Online Application Portal (IOAP) Preliminary Technical Screens A & B, and to complete the high level requirements for technical screens C-F that were not able to be completed during the timeline of INVP 4748 DG IOAP Phase 2 Feasibility study due to the pending changes of these requirements from NY Public Service Commission (PSC).

This project successfully implemented automation of Technical Screens A & B. High level requirements and data mapping for Screen C-F were captured based on the redlined version of NY SIR issued in Dec 2017. Solution options were explored for Screen C-F implementation. Finalization of the Solution option and implementation of Technical Screens C-F will occur in a subsequent project (INVP 5037) with the final SIR updates from the NY PSC in April 2018.

3 Variance Analysis

3.1 Cost Summary Table

Project Sanction Summary ($M)				
Title	**Breakdown**	**Total Actual Spend**	**Original Project Sanction Approval**	**Variance (Over) / Under**
DG IOAP Phase 2 Screens A & B	**Capex**	0.262	0.327	0.065
	Opex	0.077	0.079	0.002
	Removal	0.000	0.000	0.000
	Total	**0.339**	**0.406**	**0.067**

Closure Paper

3.2 Cost Variance Analysis

Optimized allocation of external resources and unused risk resulted in an underspend.

3.3 *Schedule Variance Table*

Schedule Variance	
Project Grade - Ready for Use Date	**3/30/2018**
Actual Ready for Use Date	**3/30/2018**
Schedule Variance	**- 0 years, 0 months, 0 days**

3.4 *Schedule Variance Explanation*

N/A

4 Final Cost by Project

Actual Spending ($M) vs. Sanction ($M)				
Project	**Breakdown**	**Total Actual Spend**	**Original Project Sanction Approval**	**Variance (Over) / Under**
5023	**Capex**	0.262	0.327	0.065
	Opex	0.077	0.079	0.002
	Removal	0.000	0.000	0.000
	Total	**0.339**	**0.406**	**0.067**

5 Improvements / Lessons Learned/Root Cause

Business commitment and their full support during the project resulted into a successful implementation of Screen A & B and high level requirements gathering for Screen C-F. (2018-LL-559)

Closure Paper

6 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	(•) Yes ( ) No
Gate E checklist completed (appl. only to CCD)	( ) Yes (•) N/A
All relevant costs have been charged to project	(•) Yes ( ) No
All work orders and funding projects have been closed	(•) Yes ( ) No
All unused materials have been returned	(•) Yes ( ) No
All IS Service Transition activities have been completed	(•) Yes ( ) No
All lessons learned have been entered appropriately into the IS Knowledge Management Tool (KMT) lesson learned database	(•) Yes ( ) No

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Rich Niggemeier/Neil LaBrake/Carol Sedewitz	Business Representative
PDM	Deb Rollins	Head of PDM
BRM	Premjith Singh	Relationship Manager
PDM	Michelle McNaught	Program Delivery Director
IS Finance	Michelle Harris	Manager
IS Regulatory	Tom Gill	Manager
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

7.2 Reviewers

N/A

8 Decisions

The US ISSC Sanctioning Committee and Executive Sponsor has reviewed and approved this paper.

Signature……..Date…….

Premjith Singh

VP IS Tower Lead, Gas Business Partner

US Sanction Paper

Title:	FY19 Customer Billing Operations Minor Works	**Sanction Paper #:**	
Project #:	INVP 5026	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	November 20, 2018
Author:	Tejal Patel	**Sponsor:**	Jody Allison, VP Billing and Collections Strategy
Utility Service:	IT	**Project Manager:**	Joel Semel

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 5026 in the amount $0.809M with a tolerance of +/- 10% for the purposes of full implementation.

This sanction amount is $0.809M broken down into:

$0.000M Capex
$0.809M Opex
$0.000M Removal

1.2 Project Summary

This project provides a funding base and governance structure that allows the IT organization to effectively deliver system changes to the Shared Services - Customer application portfolio, in response to any regulatory mandates, operational requirements and value-added enhancements that will occur during the course of the year.

Minor works requests funded by this project will support the Accounts Processing, Billing Operations, Credit & Collections and other Shared Services Customer organizations requesting changes to the Customer systems to meet a regulatory mandate, operational requirement or provides value to National Grid.

1.3 Summary of Projects

Project Number	Project Type (Elect only)	Project Title	Estimate Amount ($M)
INVP 5026		FY19 Customer Billing Operations Minor Works	0.809
		Total	0.809

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Jul 2019	Closure

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
○ Mandatory ○ Policy- Driven ○ Justified NPV ◉ Other	This Minor Works investment is best characterized as a Policy-Driven initiative. However, individual requests that fall under its umbrella may be categorized as 'Mandatory,' 'Policy-Driven', 'Justified NPV' or 'Other' depending on individual circumstances of each request.

US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

◉ Reliability ○ Environment ○ Health & Safety ○ Not Policy Driven

1.9 Complexity Level

○ High Complexity ○ Medium Complexity ◉ Low Complexity ○ N/A

Complexity Score: 14

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

○ Yes ◉ No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan ($)
IS Investment Plan FY19 - 23	◉ Yes ○ No	◉ Over ○ Under ○ NA	$0.500

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IS business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 Current Planning Horizon

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.809	0.000	0.000	0.000	0.000	0.000	0.809
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.809	0.000	0.000	0.000	0.000	0.000	0.809

1.14 Key Milestones

Milestone	**Target Date: (Month/Year)**
Start Up	Apr 2018
Project Sanction	Nov 2018
Move to Production / Last Go Live	Mar 2019
Project Complete	Mar 2019
Sanction Closure	Jul 2019

US Sanction Paper

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	☑ Internal		☑ Contractor
Construction/Implementation Resources to be provided	☑ Internal		☑ Contractor
Resource Delivery			
Availability of internal resources to deliver project:	○ Red	○ Amber	◉ Green
Availability of external resources to deliver project:	○ Red	○ Amber	◉ Green
Operational Impact			
Outage impact on network system:	○ Red	○ Amber	◉ Green
Procurement Impact			
Procurement impact on network system:	○ Red	○ Amber	◉ Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

1	Will be evaluated individually for each Minor Works Item

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	◉ Neutral	○ Positive	○ Negative
Impact on adaptability of network for future climate change:	◉ Neutral	○ Positive	○ Negative

1.18 List References

N/A

2 Decisions

The US IS Sanctioning Committee (ITSC) and Key External Stakeholders, reviewed and approved the content of the investment including:

(a) APPROVE this paper and the investment of $0.809M and a tolerance of +/-10%.

(b) NOTE that Joel Semel is the Project Manager and has the approved financial delegation.

Signature……..Date…….

Premjith Singh

VP IT Tower Head, Transmission and Capital Delivery

US Sanction Paper

3 Sanction Paper Detail

Title:	FY19 Customer Billing Operations Minor Works	**Sanction Paper #:**	
Project #:	INVP 5026	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	November 20, 2018
Author:	Tejal Patel	**Sponsor:**	Jody Allison, VP Billing and Collections Strategy
Utility Service:	IT	**Project Manager:**	Joel Semel

3.1 Background

Over the course of any year, numerous regulatory, operational requirements and enhancement requests arise, sometimes with little notice. Some of these needs can be addressed with relatively low-dollar-value solutions. In order to develop and implement such solutions, the IS organization must be able to execute small-scale initiatives quickly and effectively. The Minor Works project provides a funding base and governance structure that allows the organization to:

• Respond quickly and effectively to ad hoc demands and change requests which typically arise when there is either:
- An urgent, mandatory imperative, to meet a new requirement/order by our regulators (PSC, DPU, PUC, FERC)
- Operational changes to bring the systems back into compliance
- An enhancement request that will add value to National Grid (i.e. reduction in costs by automating a manual process, etc.)

• Assess numerous low-dollar-value initiatives without placing undue burden on the sanctioning process
• Create a channel through which IS can give due consideration to important, low-dollar-value initiatives.

3.2 Drivers

The project is driven by the IT department's need to respond quickly and effectively to the numerous regulatory, operational and value-added needs that arise over the course of any given year, within the Customer Systems.

US Sanction Paper

3.3 Project Description

The requests approved under this Minor Works project will each require less than $30K (typically, substantially less) and will represent a mix of mandatory, operational and value-added enhancement initiatives. Minor Works requests exceeding $30K or resulting in any incremental RTB will be required to follow the project governance path for projects greater than or equal to $30,000 and less than $100,000.

An Approval Committee, composed of leaders from IS and the Business, will oversee project prioritization for approval, based on assessment of priority and available funding. The Committee will approve or deny requests based on their assessment.

The Approval Committee will:

* Evaluate requests with an understanding that the minor works budget must be allocated wisely because the number and value of requests usually far exceed available funds.

* Assess requests based on their quality, urgency, regulatory attributes, and value to the company and its stakeholders.

A report will be presented at Minor Works Project Board Meeting to review the status of requests. Any associated issues related to benefits or Run-The-Business (RTB) implications will be addressed at this meeting with input from the IS Service Delivery organization.

3.4 Benefits Summary

The requests worked under this project are expected to contribute to improved system reliability and business functionality, fulfill the organization's operating requirements, and comply with regulatory mandates.

3.5 Business and Customer Issues

In order to develop/deliver the most effective solutions possible, there will be instances in which IS will draw upon business area Subject Matter Experts (SME's).

US Sanction Paper

3.6 Alternatives

Alternative 1: Defer or Reject the Project

This is not a viable solution because this course of action would mean that all agreed requests would require individual Investment Proposals. Valuable IS and Business resources would be diverted to administrative activities supporting sanction papers for multiple low-dollar-value schemes. In addition, the Business would lose the ability to implement important requests quickly and effectively, which would result in misalignment between business processes and supporting systems.

Alternative 2: Sanction and Fund Minor Works on a Less-than-Annual Basis

This is not a viable solution because this project could not be maintained in its current form, but would instead require sanctioning on a quarterly or semi-annual basis. Although this would enable each sanctioning request to be of lower dollar value, it would not align with National Grid's annual budgeting process. It would also create additional administrative burdens and reduce the flexibility of the Steering Committee's selection process. Perhaps most importantly, the additional oversight seems to be of little, if any, benefit in this case.

3.7 Safety, Environmental and Project Planning Issues

There are no significant business issues beyond what has been described elsewhere.

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Resources with the appropriate skills may not be available in a timely fashion.	2	2	2	4	4	Mitigate	The Project Manager will determine a means of handling such occurences.	Will be determined after discussions with the business.	Will be determined after discussions with the business.

US Sanction Paper

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon						
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
Project Number	Project Title	Project Estimate Level (%)	Spend ($M)	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
INVP 5026	FY19 Customer Billing Operations Minor Works	Est Lvl (e.g. +/- 10%)	CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			OpEx	0.000	0.809	0.000	0.000	0.000	0.000	0.000	0.809
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	0.809	0.000	0.000	0.000	0.000	0.000	0.809

Total Project Sanction	CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	OpEx	0.000	0.809	0.000	0.000	0.000	0.000	0.000	0.809
	Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.000	0.809	0.000	0.000	0.000	0.000	0.000	0.809

US Sanction Paper

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.309	0.000	0.000	0.000	0.000	0.000	0.309
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.309	0.000	0.000	0.000	0.000	0.000	0.309

Variance **(Business Plan-Project Estimate)**

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	(0.500)	0.000	0.000	0.000	0.000	0.000	(0.500)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(0.500)	0.000	0.000	0.000	0.000	0.000	(0.500)

3.11.3 Cost Assumptions

N/A

3.11.4 Net Present Value / Cost Benefit Analysis

N/A

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Role	Individual
Business Representative	Jody Allison
Head of PDM	Deborah Rollins
Relationship Manager	Joel Semel
Program Delivery Director	Deborah Rollins
IS Finance Management	Michelle Harris
IS Regulatory	Thomas Gill
DR&S	Diana Simkin
Service Delivery	Mark Mirizio
Enterprise Architecture	Joe Clinchot

3.12.2 Reviewers

N/A

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Other Appendices

4.2.1 Benefiting Companies

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
KeySpan Energy Delivery NY	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA
Boston Gas Company	Gas Distribution	MA
Colonial Gas Company	Gas Distribution	MA
Narragansett Electric Company	Electric Distribution	RI
Narragansett Gas Company	Gas Distribution	RI

4.3 NPV Summary

N/A

4.4 Customer Outreach Plan

N/A

US Sanction Paper

Title:	DG IOAP Phase 2 Screens C-F and CYME Server	**Sanction Paper #:**	USSC-18-291 v2
Project #:	INVP 5037 Capex: S007931	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	1/22/2019
Author:	Lydia Barrett	**Sponsor:**	Carol Sedewitz, VP Electric Asset Management
Utility Service:	IT	**Project Manager:**	Lydia Barrett

1 Executive Summary

1.1 *Sanctioning Summary*

This paper requests sanction of INVP 5037 in the amount of $2.937M with a tolerance of +/- 10% for the purposes of Full Implementation.

This sanction amount is $2.937M broken down into:

$2.511M Capex
$0.426M Opex
$0.000M Removal

1.2 *Project Summary*

In the September 2016 New York Interconnection Online Application Portal (IOAP) Functional Requirements report, utilities were given a recommended deadline of “end of 2017” to automate New York Standard Interconnection Requirements (NY SIR) technical screenings in the IOAP Phase 2. Final requirements for screens C-F were published by the New York Public Service Commission (PSC) in April 2018. Automation of preliminary technical screens A and B were delivered in January 2018. This project will deliver on automating the preliminary technical screens C-F, including upgrading the Company’s CYME power system engineering software to a server-based platform to support the automation. The upgraded system will eliminate multiple manual processes and workarounds for all distribution planning engineers across the New York, Massachusetts and Rhode Island service territories.

US Sanction Paper

1.3 *Summary of Projects*

Project Number	Project Type (Elec only)	Project Title	Estimate Amount ($M)
INVP 5037 Capex: S007931		DG IOAP Phase 2 Screens C-F and CYME Server	2.937
		Total	2.937

1.4 *Associated Projects*

Project Number	Project Title	Estimate Amount ($M)
INVP 4748	DG IOAP Phase 2 Feasibility Study	0.296
INVP 5023	DG IOAP Phase 2 Screens A & B	0.406
	Total	0.702

1.5 *Prior Sanctioning History*

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
8/28/18	USSC	$1.045M	$2.687M	Partial Sanction	+/- 25%

1.6 *Next Planned Sanction Review*

Date (Month/Year)	Purpose of Sanction Review
April 2020	Project Closure Sanction

US Sanction Paper

1.7 *Category*

Category	Reference to Mandate, Policy, NPV, or Other
◉ Mandatory ○ Policy- Driven ○ Justified NPV ○ Other	Mandatory for automation of DG IOAP Screens C-F: Reforming the Energy Vision (REV) - NY Public Service Commission (PSC) mandate (Case # 14-M-0101) Policy-Driven for CYME Server and centralized database in support of the above mandate

1.8 *Asset Management Risk Score*

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

○ Reliability ○ Environment ○ Health & Safety ◉ Not Policy Driven

1.9 *Complexity Level*

○ High Complexity ○ Medium Complexity ◉ Low Complexity ○ N/A

Complexity Score: 12

1.10 *Process Hazard Assessment*

A Process Hazard Assessment (PHA) is required for this project:

○ Yes ◉ No

US Sanction Paper

1.11 *Business Plan*

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan ($)
IT Investment Plan FY19-23	◉ Yes ○ No	◉ Over ○ Under ○ NA	$0.244M

1.12 *If cost > approved Business Plan how will this be funded?*

Re-allocation of budget within the IT business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 *Current Planning Horizon*

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.738	1.773	0.000	0.000	0.000	0.000	2.511
OpEx	0.000	0.274	0.152	0.000	0.000	0.000	0.000	0.426
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	1.012	1.925	0.000	0.000	0.000	0.000	2.937

1.14 *Key Milestones*

Milestone	Target Date: (Month Year)
Start Up	May 2018
Partial Sanction	August 2018
Begin Requirements and Design	August 2018
Project Sanction	January 2019
Begin Development and Implementation	January 2019
Move to Production / Last Go Live	December 2019
Project Closure	April 2020

1.15 *Resources, Operations and Procurement*

Resource Sourcing			
Engineering & Design Resources to be provided	☑ Internal	☐ Contractor	
Construction/Implementation Resources to be provided	☑ Internal	☑ Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	○ Red	○ Amber	◉ Green
Availability of external resources to deliver project:	○ Red	○ Amber	◉ Green
Operational Impact			
Outage impact on network system:	○ Red	○ Amber	◉ Green
Procurement Impact			
Procurement impact on network system:	○ Red	○ Amber	◉ Green

1.16 *Key Issues (include mitigation of Red or Amber Resources)*

N/A

1.17 *Climate Change*

Contribution to National Grid's 2050 80% emissions reduction target:	◉ Neutral	○ Positive	○ Negative
Impact on adaptability of network for future climate change:	◉ Neutral	○ Positive	○ Negative

1.18 *List References*

N/A

2 Decisions

I:

(a) APPROVE this paper and the investment of $2.937M and a tolerance of +/-10% for the purposes of Development and Implementation.

(b) APPROVE the run-the-business (RTB) of $0.159M (per annum) for 5 years.

(c) NOTE that Michelle McNaught is the Program Delivery Director and has the approved financial delegation.

Signature……..Date…….

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair

US Sanction Paper

3 Sanction Paper Detail

Title:	DG IOAP Phase 2 Screens C-F and CYME Server	**Sanction Paper #:**	USSC-18-291 v2
Project #:	INVP 5037 Capex: S007931	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	1/22/2019
Author:	Lydia Barrett	**Sponsor:**	Carol Sedewitz, VP Electric Asset Management
Utility Service:	IT	**Project Manager:**	Lydia Barrett

3.1 *Background*

New York's Reforming the Energy Vision's (REV's) Phase 1 objectives reflect an increasing need to adapt to a changing energy landscape. Distributed Generation (DG) grid interconnections in New York are growing at an accelerated rate. REV aims to address development of a utility-customer engagement Web platform for interconnections called the Interconnection Online Application Portal (IOAP) for all New York utilities. REV Phase 1 proposes that the IOAP be rolled out in phases – application management (Phase 1), automation of Standardized Interconnection Requirements (SIR) technical screenings (Phase 2), and full automation of all processes (Phase 3).

In the September 2016 New York Interconnection Online Application Portal Functional Requirements report (IOAP), utilities were given a recommended deadline of "end of 2017" to automate NY SIR technical screenings in the IOAP (DG IOAP Phase 2).

The Online Application Portal (Phase 1) for the New York territory was implemented in May 2017 (INVP 4411A). A Feasibility and Analysis (F&A) study for IOAP Phase 2 (INVP 4748) was undertaken and completed in October 2017 to study the available requirements from the PSC, design for screens A and B, and investigate preliminary options for screens C-F.

Since the start of the F&A study, changes to Screens D, E, and F were submitted by EPRI (Electric Power Research Institute) and the ITWG (Interconnection Technical Working Group). Because the IOAP requirements were not finalized by the NY PSC, IOAP Phase 2 would be completed with two (2) subsequent efforts.

INVP 5023 was undertaken to deliver on automation of Screens A and B, while continuing the effort of F&A for Screens C-F based on red-line versions of the requirements for the preliminary technical screens. Automation of Screens A and B was delivered in January 2018. The F&A effort conducted analysis of several options for

delivering on Screens C-F. However, without a final version of the requirements from the NY SIR, a final solution was not decided. A final version of the NY SIR was delivered in April 2018, which allowed finalizing the IOAP solution. In order to meet the new mandated date of July 19, 2018 of the tariff, an interim solution was implemented while a robust enterprise solution was planned. This second effort, to fully automate Screens C-F, is outlined in this proposal.

Information to perform preliminary technical screens is stored in the existing business system, CYME. CYME is utilized by Distribution Planning Asset Management (DPAM) group and Electric Asset Management (EAM) engineers to perform the manual evaluation of Screens C-F. The CYME Server will provide the platform required to host CYME application programming interfaces (APIs) necessary to automate the technical screens C through F.

CYME is also used for load flow analysis and the tracking and management of feeder information. Engineers currently work in isolated CYME instances which require the manual exporting of individual files by region and manual upload by each engineer when completing their assessment for other groups to be able to access the data. This distributed system inhibits model sharing, the ability to change assets universally, and creates the potential for data loss.

Implementing the CYME Server in conjunction with a centralized database will provide a solid basis for the automation of Screens C-F, as well as future additional processes performed manually today for all National Grid jurisdictions. It will eliminate the potential of safety and reliability issues for customers and field technicians due to the delay in data consolidation coupled with the removal of human intervention.

Note that the preliminary technical screens differ by jurisdiction and the proposed solution will consider that additional jurisdictions may require automation in the future.

3.2 *Drivers*

- The investment into the IOAP supports National Grid's alignment to the NY PSC's REV initiatives.
- Satisfy requirements set forth by the NY PSC will maintain National Grid's reputation and position the Company as a leader in this space.
- This project is directly in line with "Our Customers" in National Grid's Bring Energy to Life model.
- Automation of NY SIR technical screenings is expected to result in increased customer satisfaction (accelerated utility feedback on applications) and refocused engineering resources to complex projects and studies.

- The centralization of the CYME database will enable engineers to work collaboratively across regions and engineering disciplines because of real-time updates as well as provide additional protection against lost data.

3.3 *Project Description*

This project will automate preliminary technical screens C-F per the New York PSC mandate, and implement the CYME Server product along with a centralized CYME database. The technical screenings provide interconnection viability feedback to customers and trade allies. Automation of the technical screenings will streamline the DG application process for customers and National Grid engineering groups. Proper feedback of technical screening information is expected to be integrated into the IOAP as well to foster transparency to customers. Technical screens will be performed for all complex NY DG applications.

The project will consist of the following:

- Plan, design, document and test necessary applications and/or tools to deploy automation of SIR technical screening in IOAP:

  Screen C - EPS Rating Exceeded Test
  - Is the EPS rating exceeded with addition of DG?

  Screen D - Line Configuration Test
  - Is the line configuration compatible?

  Screen E - Simplified Penetration Test
  - Is aggregate DG, including DG in the queue, less than 15% of feeder peak load?

  Screen F - Simplified Voltage fluctuation Test
  - Is new DG less than 10% of the feeder rating? OR
  - Does new DG cause a voltage rise greater than 3% of nominal?

- Modify the existing workflow within the IOAP (also known as National Grid Customer Application Portal – nCAP) to initiate automated screens when an application is submitted
- Implement CYME Server & centralize CYME Network Model database
- Integrate internal data systems to IOAP nCAP portal
- Provide additional reporting capabilities

During the Requirements & Design phase of the project, the following were accomplished:

- Documented Business Requirements for DG IOAP Technical Screens C-F, CYME Server and Centralized Database

- Developed Solution Design
- Provisioned the development environment infrastructure to support the proof of concept
- Completed Proof of Concept for CYME Desktop Virtualization and Centralized Database connectivity
- Finalized Solution Implementation Roadmap

3.4 *Benefits Summary*

- The investment into the IOAP supports National Grid's alignment to the NY PSC's REV initiatives.
- Satisfying requirements set forth by the NY PSC is expected to further National Grid's reputation and position as a leader in this space.
- Automation of SIR technical screenings is expected to improve customer satisfaction by providing accelerated utility feedback on applications.
- Simplification and automation of manual processes of maintaining distribution system information will drive efficiencies within the business.
- The solution will provide the ability to track changes to feeder models and apply changes related to assets universally.

3.5 *Business and Customer Issues*

There are no significant business issues beyond what has been described elsewhere.

3.6 *Alternatives*

Alternative 1: Defer Screen C-F Automation
Deferring Screens C-F would leave National Grid non-compliant with IOAP Phase 2, PSC Case # 14-M-0101.

Alternative 2: Automate Screens C-F without CYME Server
This option is rejected because it would require additional interfaces to be built to consolidate information prior to running each screening, would require the continuation of additional manual processes and the potential for safety and reliability issues.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant business issues beyond what has been described elsewhere.

3.8 *Execution Risk Appraisal*

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Business & Vendor resources may not be available as needed on the project.	3	4	4	12	12	Mitigate	Get a firm commitment for IT partner, Vendor and Business resources early on with an appropriate backfill resource plan as needed.	Cost and Schedule impacts	Re-prioritize deliverables and adjust resource allocation or secure alternate resources to keep cost and schedule in check.

3.9 *Permitting*

N/A

3.10 *Investment Recovery*

3.10.1 *Investment Recovery and Regulatory Implications*

Recovery will occur at the time of the next rate case for any operation company receiving allocations of these costs.

3.10.2 *Customer Impact*

N/A

3.10.3 *CIAC / Reimbursement*

N/A

US Sanction Paper

3.11 *Financial Impact to National Grid*

3.11.1 *Cost Summary Table*

Project Number	Project Title	Project Estimate Level (%)	Spend ($M)	Prior Yrs	Current Planning Horizon Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	Total
INVP 5037 Capex: S007931	DG IOAP Phase 2 Screens C-F and CYME Server	Est Lvl (+/-10%)	CapEx	0.000	0.776	1.720	0.000	0.000	0.000	0.000	2.496
			OpEx	0.000	0.274	0.167	0.000	0.000	0.000	0.000	0.441
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.050	1.887	0.000	0.000	0.000	0.000	2.937
Total Project Sanction			CapEx	0.000	0.738	1.773	0.000	0.000	0.000	0.000	2.511
			OpEx	0.000	0.274	0.152	0.000	0.000	0.000	0.000	0.426
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.012	1.925	0.000	0.000	0.000	0.000	2.937

3.11.2 *Project Budget Summary Table*

Project Costs Per Business Plan

$M	Prior Yrs (Actual)	Current Planning Horizon Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	Total
CapEx	0.000	1.754	0.000	0.000	0.000	0.000	0.000	1.754
OpEx	0.000	0.850	0.089	0.000	0.000	0.000	0.000	0.939
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	2.604	0.089	0.000	0.000	0.000	0.000	2.693

Variance (Business Plan-Project Estimate)

$M	Prior Yrs (Actual)	Current Planning Horizon Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	Total
CapEx	0.000	1.016	(1.773)	0.000	0.000	0.000	0.000	(0.757)
OpEx	0.000	0.576	(0.063)	0.000	0.000	0.000	0.000	0.513
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	1.592	(1.836)	0.000	0.000	0.000	0.000	(0.244)

3.11.3 *Cost Assumptions*

This estimate was developed in 2018 using the standard IS estimating methodology, which includes an assessment of project costs. Examples of these project costs are internal and contract labor, hardware and software to deliver the project, cost of living adjustments for multi-year projects, AFUDC for capital investments, risk, as well as ongoing support costs. Standard rates are used in the estimate to promote consistency

(ex: internal labor rates, cost of living adjustments %, AFUDC % and risk %). The accuracy level of estimate is identified in table 3.11.1.

3.11.4 *Net Present Value / Cost Benefit Analysis*

This is not an NPV project.

3.11.5 *Additional Impacts*

None.

3.12 *Statements of Support*

3.12.1 *Supporters*

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Kevin Stablewski / Wajiha Mahmoud	Business Representative
Business Partner (BP)	Orla Daly	Relationship Manager
Program Delivery Management (PDM)	Michelle McNaught	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Daniel DeMauro	Director
Digital Risk and Security (DR&S)	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

3.12.2 *Reviewers*

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 *Sanction Request Breakdown by Project*

N/A

4.2 *Project Cost Breakdown*

Project Cost Breakdown $ (millions)					
Cost Category	**sub-category**	**Value of Work to Date (VOWD)**	**Forecast to Complete (FTC)**	**Forecast At Completion (FAC=VOWD+FTC)**	**Name of Firm(s) providing resources**
Personnel	NG Resources	0.292	0.393	0.685	
	SDC Time & Materials	0.117	0.240	0.357	IBM
		0.035	0.232	0.267	WiPro
		0.019	0.045	0.064	DXC
		0.000	0.019	0.019	Verizon
	SDC Fixed-Price	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	All other personnel	0.140	0.868	1.008	Accenture, CYME
	TOTAL Personnel Costs	**0.603**	**1.797**	**2.400**	
Hardware	Purchase	0.000	-	-	-
	Lease	0.000	0.014	0.014	-
Software		0.003	0.152	0.155	JIRA, CYME, SQL DB, Win Server
Risk Margin			0.164	0.164	
AFUDC		0.001	0.111	0.113	
Other		0.010	0.082	0.091	Shared OH, Expenses
TOTAL Costs		0.617	2.320	2.937	

4.3 *Benefiting Operating Companies*

This investment will be allocated in two ways. The work will be allocated to the electric distribution companies as follows:

4.3.1.1 *DG IOAP Screens C-F Automation*

Work to implement the robust automation of DG IOAP Phase 2 technical screens C-F will be allocated only to Niagara Mohawk Power Electric Distribution because this is mandated work from the NY PSC and will not be implemented in other jurisdictions.

US Sanction Paper

Operating Company Name	Business Area	State
Niagara Mohawk Power	Electric Distribution	NY

4.3.1.2 *CYME Server and Centralized Database*

CYME Server and centralized database work will be allocated to the following companies because all Electric Distribution will benefit. Allocation is based upon the number of customers.

Benefiting Operating Companies Table:

Operating Company Name	Business Area	State
Niagara Mohawk Power	Electric Distribution	NY
Massachusetts Electric	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA
Narragansett Electric Company	Electric Distribution	RI

4.4 *IS Ongoing Operational Costs (RTB):*

This project will increase IT ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

The increase in RTB is attributed to the software licenses, hardware lease, interface operational support cost, and application support cost.

All figures in $ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB	25.5	29.5	29.5	29.5	29.5	**143.5**
Last Sanction Business Net Impact to RTB	135.6	187.8	187.8	187.8	187.8	**886.8**
Last Sanction Total Net Impact to RTB	161.1	217.3	217.3	217.3	217.3	1,030.3
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB	28.5	29.0	29.0	29.0	29.0	**144.5**
Business Budgeted Net Impact to RTB	-	-	-	-	-	-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	**29.0**	**121.2**	**121.2**	**121.2**	**121.2**	**513.9**
Business Funded Net Impact to RTB Forecasted at Go-Live	**9.5**	**37.8**	**37.8**	**37.8**	**37.8**	**160.7**
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	(0.5)	(92.2)	(92.2)	(92.2)	(92.2)	(369.4)
Business Budgeted Net Impact to RTB Variance	(9.5)	(37.8)	(37.8)	(37.8)	(37.8)	(160.7)

4.5 *NPV Summary (if applicable)*

N/A

4.6 *Customer Outreach Plan*

N/A

US Sanction Paper

Title:	EPA Portfolio Manager Integration Phase 2	**Sanction Paper #:**	
Project #:	INVP 5099 Capex: S007974	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	1/4/2019
Author:	Susan Stallard Teders	**Sponsor:**	John Isberg, VP Market Development
Utility Service:	IT	**Project Manager:**	Michael Pawlowski

1 Executive Summary

1.1 *Sanctioning Summary*

This paper requests sanction of INVP 5099 in the amount of $0.645M with a tolerance of +/- 10% for the purposes of Full Implementation.

This sanction amount is $0.645 broken down into:

$0.552M Capex
$0.120M Opex
$0.000M Removal

1.2 *Project Summary*

This project will provide enhancements to the current services that enable automated sharing of aggregated building energy consumption data with the United States (US) Environmental Protection Agency's (“EPA”) free online tool, ENERGY STAR Portfolio Manager, (“Portfolio Manager”). The New York City Council mandated the use of EPA Portfolio Manager by New York City’s large property owners for building environmental benchmarking. The system was implemented by National Grid in January 2018.

Following initial release of the system, enhancements were recommended by the City of New York pertaining to real time notifications to customers in hopes of reducing long lead times for data loads, due to errors in submissions that require manual interventions. While the data load challenges have affected customers in all jurisdictions (NY, MA, and RI), the New York property owners have raised the concern that the issues are beginning to impact their ability to comply with the requirements of New York City Council Local Law (LL) 84.

As the EPA Portfolio Manager (PM) system is currently used in all National Grid jurisdictions, Rhode Island (RI) and Massachusetts (MA) customers will also benefit from the enhancements required by New York City mandate.

US Sanction Paper

1.3 *Summary of Projects*

Project Number	Project Title	Estimate Amount ($M)
INVP 5099 Capex: S007974	EPA Portfolio Manager Integration Phase 2	0.645
	Total	0.645

1.4 *Associated Projects*

Project Number	Project Title	Estimate Amount ($M)
INVP 4449 Capex: S007673	EPA Portfolio Manager Integration	0.792
	Total	0.792

1.5 *Prior Sanctioning History*

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
9/28/18	ISSC	$0.263M	$0.850M	Partial	+/-25%

1.6 *Next Planned Sanction Review*

Date (Month/Year)	Purpose of Sanction Review
June 2019	Project Closure Sanction

1.7 *Category*

Category	Reference to Mandate, Policy, NPV, or Other
◉ Mandatory ○ Policy- Driven ○ Justified NPV ○ Other	Mandatory – Regulatory compliance with the New York City Council, Local Law (LL) 84 requires owners of large buildings to annually measure their energy and water consumption in a process called benchmarking.

US Sanction Paper

1.8 *Asset Management Risk Score*

Asset Management Risk Score: 27

Primary Risk Score Driver: (Policy Driven Projects Only)

○ Reliability ○ Environment ○ Health & Safety ◉ Not Policy Driven

1.9 *Complexity Level*

○ High Complexity ○ Medium Complexity ◉ Low Complexity ○ N/A

Complexity Score: 14

1.10 *Process Hazard Assessment*

A Process Hazard Assessment (PHA) is required for this project:

○ Yes ◉ No

1.11 *Business Plan*

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan ($)
IT Investment Plan FY18 - 23	◉ Yes ○ No	○ Over ◉ Under ○ NA	$0.017

US Sanction Paper

1.12 *If cost > approved Business Plan how will this be funded?*

Re-allocation of budget within the IT business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 *Current Planning Horizon*

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.522	0.000	0.000	0.000	0.000	0.000	0.522
OpEx	0.000	0.120	0.003	0.000	0.000	0.000	0.000	0.123
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.642	0.003	0.000	0.000	0.000	0.000	0.645

1.14 *Key Milestones*

Milestone	**Target Date: (Month Year)**
Start Up	August 2018
Partial Sanction	September 2018
Begin Requirements and Design	September 2018
Project Sanction	January 2019
Begin Development and Implementation	December 2018
Begin User Acceptance Testing	January 2019
Move to Production / Last Go Live	February 2019
Project Closure	June 2019

US Sanction Paper

1.15 *Resources, Operations and Procurement*

Resource Sourcing			
Engineering & Design Resources to be provided	☑ Internal		☑ Contractor
Construction/Implementation Resources to be provided	☑ Internal		☑ Contractor
Resource Delivery			
Availability of internal resources to deliver project:	○ Red	○ Amber	◉ Green
Availability of external resources to deliver project:	○ Red	○ Amber	◉ Green
Operational Impact			
Outage impact on network system:	○ Red	○ Amber	◉ Green
Procurement Impact			
Procurement impact on network system:	○ Red	○ Amber	◉ Green

1.16 *Key Issues (include mitigation of Red or Amber Resources)*

N/A

1.17 *Climate Change*

Contribution to National Grid's 2050 80% emissions reduction target:	◉ Neutral	○ Positive	○ Negative
Impact on adaptability of network for future climate change:	◉ Neutral	○ Positive	○ Negative

1.18 *List References*

N/A

2 Decisions

The US IT Sanctioning Committee (ITSC) and Executive Sponsor have reviewed and approved this paper:

(a) APPROVED this paper and the investment of $0.645M and a tolerance of +/- 10% for the purposes of Development and Implementation .

(b) APPROVED the run-the-business (RTB) of $0.007M for FY20 and FY21 and $0.006M (per annum) for 3 years.

(c) NOTED that Mike Pawlowski is the Project Manager and has the approved financial delegation.

Signature……..Date…….

Premjith Singh

VP IT Tower Lead – Gas Business Partner

3 Sanction Paper Detail

Title:	EPA Portfolio Manager Integration Phase 2	**Sanction Paper #:**	
Project #:	INVP 5099 Capex: S007974	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	1/4/2019
Author:	Susan Stallard Teders	**Sponsor:**	John Isberg, VP Market Development
Utility Service:	IT	**Project Manager:**	Michael Pawlowski

3.1 *Background*

The US EPA Portfolio Manager is an online resource management tool that is used to measure and track energy and water consumption, as well as greenhouse gas emissions. This tool is used to benchmark the performance of one building or a whole portfolio of buildings in a secure online environment. The use of the tool will help customers to identify the buildings for which goals and baselines can be set, and then track any improvements that are made.

National Grid is obligated to provide aggregated consumption data to their customers that are required to use EPM Portfolio Manager benchmarking and environmental reporting. The following mandated requirements have been set forth by the New York City Council local law, RI Office of Energy Resources (OER) and the City of Boston Energy & Reporting Disclosure Ordinance.

In addition, developing and promoting this service to commercial accounts will allow National Grid to strengthen their relationship with key commercial, industrial, municipal customers and state agencies in New York (NY), RI and MA.

The EPA Portfolio Manager Integration project, implemented in January 2018, delivered the technology that allows National Grid customers to use the EPA Portfolio Manager, however the aggregate data upload system has experienced numerous issues that have limited the EPM users from receiving aggregated energy consumption data for their premises.

National Grid has developed a road map outlining the corrective actions, which will help:

- Reduce customer errors,
- Improve the current upload process for the Company's EPM users
- Provide real-time data validation to EPM users therefore reducing validation issues that occur at the time of entry.

.

3.2 *Drivers*

To be in compliance with NYC Local Law 84, and improve the reliability of the data upload process for customers in all jurisdictions.

3.3 *Project Description*

This project will update the existing EPA Portfolio Manager data upload process and potentially require changes to the Company's billing systems (CSS and CRIS).
The updates include:

- Real time Property share and Billing account validation on the webform to provide the customer with immediate notification of the form data;
- Develop an interface to handle meter share requests and handle rejection of meter sharing requests; and
- Added functionality to allow the customer to modify and resubmit existing share requests.

3.4 *Benefits Summary*

Regulatory compliance with the New York City Council Local Law 84 and improved input controls, functionality, and reliability within the supporting processes.

3.5 *Business and Customer Issues*

There are no significant business issues beyond what has been described elsewhere.

3.6 *Alternatives*

Alternative 1: Rejected - Do Nothing. This will lead to National Grid being out of compliance with NYC, City Of Boston and RI Office of Energy Resources (OER) mandates.

Alternative 2: Rejected – Delay implementation. In October 2016, The New York City Council approved lowering the building threshold to greater than 25,000 square feet for Local Law 84. This change will go into effect in January 2019. Delay of the project will not allow National Grid to meet the NYC deadline for having the systems ready.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant issues beyond what has been described elsewhere.

US Sanction Paper

3.8 *Execution Risk Appraisal*

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	The project will deliver a combined solution for a mandate & several non-mandated efforts. There is a risk that a combined approach could cause delays to any given individual effort.	3	2	3	6	9	Mitigate	Construct an approach wherein each effort is managed as a related, but separate work stream to allow flexibility of phasing work with priority given to the mandated work.	Resource constraints may not be able to support a phased approach.	As the project progresses, continue to identify areas where phases can be managed in parallel as early as possible in order to allow adequate time to on-board critical incremental resources.
2	As the project progresses, jurisdictions representing the non-mandated effort may issue rulings that expand the mandate scope.	2	2	2	4	4	Mitigate	Monitor during requirements gathering and invoke change request process as necessary.	Resource, budget & time constraints of original scope may not be able to support additional scope.	TBD

3.9 *Permitting*

N/A

3.10 *Investment Recovery*

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

US Sanction Paper

3.11 *Financial Impact to National Grid*

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend ($M)	Prior Yrs	Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	Total
INVP 5099 Capex: S007974	EPA Portfolio Manager Integration Phase 2	+/- 10%	CapEx	0.000	0.522	0.000	0.000	0.000	0.000	0.000	0.522
			OpEx	0.000	0.120	0.003	0.000	0.000	0.000	0.000	0.123
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	0.642	0.003	0.000	0.000	0.000	0.000	0.645

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

		Current Planning Horizon						
$M	Prior Yrs (Actual)	Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	Total
CapEx	0.000	0.522	0.000	0.000	0.000	0.000	0.000	0.522
OpEx	0.000	0.140	0.000	0.000	0.000	0.000	0.000	0.140
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.662	0.000	0.000	0.000	0.000	0.000	0.662

Variance (Business Plan-Project Estimate)

		Current Planning Horizon						
$M	Prior Yrs (Actual)	Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	Total
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.020	(0.003)	0.000	0.000	0.000	0.000	0.017
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.020	(0.003)	0.000	0.000	0.000	0.000	0.017

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the standard IS estimating methodology. The accuracy level of estimate for each project is identified in table 3.11.1

3.11.4 Net Present Value / Cost Benefit Analysis

This is not an NPV Project.

3.11.4.1 *NPV Summary Table*

N/A

3.11.4.2 *NPV Assumptions and Calculations*

N/A

3.11.5 Additional Impacts

N/A

3.12 *Statements of Support*

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Melanie Littlejohn Patricia Winand	Business Representative
Business Partner (BP)	Orla Daly	Relationship Manager
Global Solutions Development	Michael Pawlowski	Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Tom Gill	Manager
Digital Risk and Security (DR&S)	Michael Isenberg	Manager
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

3.12.2 Reviewers

N/A

4 Appendices

4.1 *Sanction Request Breakdown by Project*

N/A

4.2 *Other Appendices*

4.2.1 Project Cost Breakdown

Project Cost Breakdown $ (millions)					
Cost Category	**sub-category**	**Value of Work to Date (VOWD)**	**Forecast to Complete (FTC)**	**Forecast At Completion (FAC=VOWD+FTC)**	**Name of Firm(s) providing resources**
Personnel	NG Resources		0.037	0.037	
	SDC Time & Materials		0.331	0.331	IBM
			0.070	0.070	WiPro
			-	-	DXC
			-	-	Verizon
	SDC Fixed-Price		-	-	IBM
			-	-	WiPro
			-	-	DXC
			-	-	Verizon
	All other personnel		0.134	0.134	
	TOTAL Personnel Costs	**-**	**0.572**	**0.572**	
Hardware	Purchase		-	-	
	Lease		-	-	
Software			-	-	
Risk Margin			0.057	0.057	
AFUDC			0.009	0.009	
Other			0.006	0.006	
TOTAL Costs		-	0.645	0.645	

US Sanction Paper

4.2.2 Benefiting Operating Companies

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp - Electric	Electric Distribution	NY
Niagara Mohawk Power Corp – Gas	Gas Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA
Narragansett Gas Company	Gas Distribution	RI
Narragansett Electric Company	Electric Distribution	RI
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Colonial Gas Company	Gas Distribution	MA

4.2.3 IS Ongoing Operational Costs (RTB):

This project will increase IT ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

RTB costs will increase due to IBM and Wipro support cost increases.

all figures in $ thousands						
INV ID:	5099				**Date RTB Last Forecasted**	12/03/2018
Investment Name:	EPM Phase 2					
Project Manager:	Vijaya Kuntimaddi			**PDM:**	Mike Pawlowksi	
All figures in $ thousands	**Yr. 1**	**Yr. 2**	**Yr. 3**	**Yr. 4**	**Yr. 5**	**Total**
	FY 19/20	**FY 20/21**	**FY 21/22**	**FY 22/23**	**FY 23/24**	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB						-
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB						-
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	**7.0**	**7.0**	**6.0**	**6.0**	**6.0**	**32.0**
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	(7.0)	(7.0)	(6.0)	(6.0)	(6.0)	(32.0)
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-

4.3 *NPV Summary (if applicable)*

N/A

4.4 *Customer Outreach Plan*

N/A

US Sanction Paper

Title:	GTIS - Slice of System	**Sanction Paper #:**	USSC-18-286 v2
Project #:	INVP 5108 Capex: S007929	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	10/2/2018
Author:	Paula Higgins	**Sponsor:**	John Vaughn, VP Energy Procurement
Utility Service:	IS	**Project Manager:**	Paula Higgins

1 Executive Summary

1.1 *Sanctioning Summary*

This paper requests full sanction of INVP 5108 in the amount of $1.307M with a tolerance of +/- 10% for the purposes of full implementation.

This sanction amount is $1.307M broken down into:

$0.913M Capex
$0.394M Opex
$0.000M Removal

1.2 *Project Summary*

In the Joint Proposal settlement for Niagara Mohawk Power Corporation (“NMPC”) rate case (Case 17-G-0239), National Grid agreed to change its business practices in Upstate NY for Gas Energy Service Companies (“ESCOs”). The Joint Proposal requires a “Slice of the System” approach to pipeline capacity allocation for a pro rata share of the Dominion, Iroquois, and Tennessee pipeline transportation and storage assets in NMPC’s natural gas portfolio. The agreement also requires the creation of temperature related city gate requirements along multiple interstate pipelines, allocation and release of peaking supply assets to ESCOs, as needed, and the sharing of Asset Management Agreement credits with ESCOs.

This investment will deliver modifications to the Transportation Service Application (“TSA”), Customer Service System (“CSS”), and Electronic Bulletin Board (“EBB”) customer and ESCO applications to provide the reporting assets and system modifications needed by National Grid to support the manual calculation of capacity, penalties, and miscellaneous billing components, as well as to enable new pipelines on EBB to meet the regulatory requirements reflected in the Joint Proposal.

The above solution is deemed the most cost effective compared to a full system implementation of GTIS and considering the need to meet the timeline set out in the rate case settlement agreement. The Company will also continue to evaluate whether there is a positive business case that supports the full migration to GTIS or another strategic solution that could be leveraged across the gas business.

US Sanction Paper

1.3 *Summary of Projects*

Project Number	Project Type (Elec only)	Project Title	Estimate Amount ($M)
5108		GTIS - Slice of System	1.307
		Total	1.307

1.4 *Associated Projects*

N/A

1.5 *Prior Sanctioning History*

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
8/21/18	USSC	$0.864M	$1.347M	R&D	+/- 10%

1.6 *Next Planned Sanction Review*

Date (Month/Year)	Purpose of Sanction Review
January 2019	Project Closure Sanction

1.7 *Category*

Category	Reference to Mandate, Policy, NPV, or Other
◉ Mandatory ○ Policy- Driven ○ Justified NPV ○ Other	Requirements are aligned to NY CASE 17-E 0238, CASE 17-G-0239, CASE 14-M-0042, CASE 12-G-0202

US Sanction Paper

1.8 ***Asset Management Risk Score***

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

○ Reliability ○ Environment ○ Health & Safety ◉ Not Policy Driven

1.9 ***Complexity Level***

○ High Complexity ◉ Medium Complexity ○ Low Complexity ○ N/A

Complexity Score: 19

1.10 ***Process Hazard Assessment***

A Process Hazard Assessment (PHA) is required for this project:

○ Yes ◉ No

1.11 ***Business Plan***

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan ($)
IS Investment Plan FY19 - 23	◉ Yes ○ No	○ Over ◉ Under ○ NA	$5.238M

1.12 ***If cost > approved Business Plan how will this be funded?***

N/A

1.13 ***Current Planning Horizon***

US Sanction Paper

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.913	0.000	0.000	0.000	0.000	0.000	0.913
OpEx	0.000	0.394	0.000	0.000	0.000	0.000	0.000	0.394
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	1.307	0.000	0.000	0.000	0.000	0.000	1.307

1.14 *Key Milestones*

Milestone	**Target Date: (Month Year)**
Partial Sanction	August 2018
Begin Requirements and Design	July 2018
Project Sanction	October 2018
Begin Development and Implementation	September 2018
Move to Production / Last Go Live	November 2018
Project Closure	January 2019

1.15 *Resources, Operations and Procurement*

Resource Sourcing			
Engineering & Design Resources to be provided	☑ Internal	☑ Contractor	
Construction/Implementation Resources to be provided	☐ Internal	☐ Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	○ Red	○ Amber	◉ Green
Availability of external resources to deliver project:	○ Red	○ Amber	◉ Green
Operational Impact			
Outage impact on network system:	○ Red	○ Amber	◉ Green
Procurement Impact			
Procurement impact on network system:	○ Red	○ Amber	◉ Green

US Sanction Paper

1.16 *Key Issues (include mitigation of Red or Amber Resources)*

N/A

1.17 *Climate Change*

Contribution to National Grid's 2050 80% emissions reduction target:	◉ Neutral	○ Positive	○ Negative
Impact on adaptability of network for future climate change:	◉ Neutral	○ Positive	○ Negative

1.18 *List References*

N/A

2 Decisions

I:

(a) APPROVE this paper and the investment of $1.307M and a tolerance of +/-10% for the purposes of full implementation.

(d) NOTE that Paula Higgins is the Project Manager and has the approved financial delegation.

Signature……..Date…….

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair

3 Sanction Paper Detail

Title:	GTIS - Slice of System	**Sanction Paper #:**	USSC-18-286 v2
Project #:	INVP 5108 Capex: S007929	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	10/2/2018
Author:	Douglas McCarthy	**Sponsor:**	John Vaughn, VP Energy Procurement
Utility Service:	IS	**Project Manager:**	Paula Higgins

3.1 *Background*

National Grid has agreed to change its business practices in Upstate NY for gas Energy Service Companies ("ESCOs") in accordance with Niagara Mohawk's ("NMPC") rate case settlement Joint Proposal in Case 17-G-0239. National Grid will implement a "Slice of the System" approach to transportation and storage contract asset allocation. These assets will be released to ESCOs on a pro rata basis based upon the following:

- NMPC's natural gas portfolio
- Temperature related city gate requirements along multiple interstate pipelines for ESCOs' customer load pools
- Allocation and release of peaking supply assets for ESCOs to utilize during the winter
- Sharing of AMA credits with ESCOs

National Grid currently has contracts with the Dominion, Iroquois, and Tennessee pipeline companies for transportation and storage.

The new requirements are due in production by November 1, 2018.

These changes would have a significant impact to the existing retail access billing system - Transportation Service Application ("TSA"), which is based on a single pipeline model. These changes will impact all areas of NMPC's gas retail access program from asset releases, customer daily load requirements, ESCO imbalances, and ESCO billing. The NMPC gas territory currently has 112,000 customers served by 60 ESCOs.

In order to meet the regulatory mandated in-service date, National Grid will be implementing a manual approach to the calculation and reporting for the new requirements. A number of enhancements to TSA, CSS, and EBB will be required to provide the information driving the manual calculation and reporting. These enhancements will be funded through this investment. Note that full automation of the "Slice of System" requirements may follow, should a positive business case be developed for that investment.

3.2 *Drivers*

The key business drivers for this investment include:

- Compliance with a regulatory mandated process;
- Promoting equitable distribution of pipeline capacity and costs between ESCO's and National Grid's full service customers.

3.3 *Project Description*

The project team consists of National Grid IS and IBM resources to provide updates to legacy systems (TSA, EBB, and CSS) and interfaces. The team's initial focus is to deliver the business requirements defined for the system and interface changes that enable the business to manually calculate bills, and accept and confirm nominated gas on the additional two pipelines. Design and development components are traced back to each business requirement. Test strategy and approach aligns and traces back to business requirements for end-to-end validation of changes, while ensuring no current state processes are negatively impacted.

3.4 *Benefits Summary*

The key benefits for this investment include:

- Compliance with a regulatory mandated process;
- Upstate NY ESCOs and their customers have access to multiple pipelines for transportation and gas storage;
- Benefit to National Grid sales customers through fair distribution of pipeline assets and related costs;
- Enables business to perform the manual calculations and data transfers required to operate the gas system in alignment to regulatory requirement.

3.5 *Business and Customer Issues*

There are no significant business issues beyond what has been described elsewhere.

3.6 *Alternatives*

Alternative 1: Fully automate requirements through enhancement of the TSA application to support multiple pipelines.

This solution is not recommended as the complexity of the enhancements to the TSA application would require rebuilding the system on current platforms at costs approaching the estimates for migration of the upstate NY gas customers into GTIS:

- The TSA system is on an unsupported platform with limited IS resources to re-code and maintain system;
- TSA is built on antiquated architecture using unsupported .NET version 2.0.

Alternative 2: Migration of upstate NY customers onto GTIS:

This solution is not recommended at the current time due to the following:

- This solution does not support the regulatory requirement for go-live in November 2018;
- Support of manual calculation is more cost effective approach and will benefit NMPC's gas customers.

Alternative 3: Do Nothing

This solution is not recommended as will lead to regulatory non-compliance.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant issues beyond what has been described elsewhere.

3.8 *Execution Risk Appraisal*

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Legacy systems changes to support the manual process could pose additional cost and schedule impacts, due to the lack of legacy knowledge and the antiquated code base.	3	3	2	9	6	Mitigate	Ensure partners are using resources with the most legacy system knowledge.	Transition Plan defined, update documentation with data, interface, and process changes	Transition Plan review and acceptance.

3.9 *Permitting*

N/A

3.10 *Investment Recovery*

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for NMPC.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 *Financial Impact to National Grid*

3.11.1 Cost Summary Table

					Current Planning Horizon						
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
Project Number	Project Title	Project Estimate Level (%)	Spend ($M)	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
5108	GTIS - Slice of System	+/- 25%	CapEx	0.000	0.913	0.000	0.000	0.000	0.000	0.000	0.913
			OpEx	0.000	0.394	0.000	0.000	0.000	0.000	0.000	0.394
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.307	0.000	0.000	0.000	0.000	0.000	1.307

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	1.178	3.380	0.282	0.000	0.000	0.000	4.840
OpEx	0.000	0.730	0.000	0.975	0.000	0.000	0.000	1.705
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	1.908	3.380	1.257	0.000	0.000	0.000	6.545

Variance (Business Plan-Project Estimate)

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.265	3.380	0.282	0.000	0.000	0.000	3.927
OpEx	0.000	0.336	0.000	0.975	0.000	0.000	0.000	1.311
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.601	3.380	1.257	0.000	0.000	0.000	5.238

3.11.3 Cost Assumptions

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 *NPV Summary Table*

N/A

US Sanction Paper

3.11.4.2 ***NPV Assumptions and Calculations***

N/A

3.11.5 Additional Impacts

3.12 *Statements of Support*

3.12.1 ***Supporters***

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	John Vaughn	Business Representative
PDM	Deb Rollins	Head of PDM
BRM	Premjith Singh	Relationship Manager
PDM	Bill Myles	Program Delivery Director
IS Finance	Michelle Harris	Director
IS Regulatory	Dan DeMauro	Director
DR&S	Peter Shattuck	Director
Service Delivery	Mark Mirizio	Director
Enterprise Architecture	Joe Clinchot	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 *Sanction Request Breakdown by Project*

$M	5108
CapEx	0.274
OpEx	0.169
Total	0.443

US Sanction Paper

4.2 *Other Appendices*

4.2.1 Project Cost Breakdown

Project Cost Breakdown $ (millions)					
Cost Category	**sub-category**	**Value of Work to Date (VOWD)**	**Forecast to Complete (FTC)**	**Forecast At Completion (FAC=VOWD+FTC)**	**Name of Firm(s) providing resources**
Personnel	NG Resources	0.188	0.136	0.324	
	SDC Time & Materials	0.111	0.462	0.573	IBM
		0.010	0.090	0.100	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	SDC Fixed-Price	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	All other personnel	0.071	0.027	0.098	FDM Group and Pontoon
	TOTAL Personnel Costs	**0.380**	**0.715**	**1.095**	
Hardware	Purchase	0.000	-	-	
	Lease	0.000	-	-	
Software		0.000	-	-	
Risk Margin			0.131	0.131	
AFUDC		0.000	0.019	0.019	
Other		0.006	0.056	0.062	Travel and Expenses and Shared Overhead
TOTAL Costs		0.385	0.922	1.307	

4.2.2 Benefiting Operating Companies

This investment addresses requirements set forth by the NiMO rate case settlement for ESCO access to natural gas pipelines.

Benefiting Operating Companies Table:

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.	Gas Distribution	NY

4.2.3 IS Ongoing Operational Costs (RTB):

There are no incremental operations support costs associated to this investment. These are also known as Run the Business (RTB) costs.

All figures in $ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB						-
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB						-
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	-	-	-	-	-	-
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-

4.3 *NPV Summary (if applicable)*

N/A

4.4 *Customer Outreach Plan*

N/A

nationalgrid

Closure: US Sanction Paper

Title:	GTIS - Slice of System	Sanction Paper #:	USSC-18-286 C
Project #:	INVP 5108	Sanction Type:	Closure
Capex #:	S007929		
Operating Company:	National Grid USA Svc. Co.	Date of Request:	7/30/2019
Author:	Higgins,Paula	Sponsor(s):	Vaughn, John V. VP Gas Energy Procurement
Utility Service:	IT	Project Manager:	Higgins,Paula

Executive Summary

This paper is presented to close INVP 5108. The total spend was $0.973M. The original sanctioned amount for this project was $1.307M at +/- 10%.

Project Summary

In the Joint Proposal settlement for Niagara Mohawk Power Corporation ("NMPC") rate case (Case 17-G-0239), National Grid agreed to change its business practices in Upstate NY for Gas Energy Service Companies ("ESCOs"). The Joint Proposal required a "Slice of the System" approach to pipeline capacity allocation for a pro rata share of the Dominion, Iroquois, and Tennessee pipeline transportation and storage assets in NMPC's natural gas portfolio. The agreement also required the creation of temperature related city gate requirements along multiple interstate pipelines, allocation and release of peaking supply assets to ESCOs, as needed, and the sharing of Asset Management Agreement credits with ESCOs.

This investment delivered modifications to the Transportation Service Application ("TSA"), Customer Service System ("CSS"), and Electronic Bulletin Board ("EBB") customer and ESCO applications which provided the reporting assets and system modifications needed by National Grid to support the manual calculation of capacity, penalties, and miscellaneous billing components, as well as to enable new pipelines on EBB to meet the regulatory requirements reflected in the Joint Proposal.

Schedule Variance Table

	Schedule Variance
Project Grade - Ready to use Date	11/30/2018
Actual Ready to use Date	10/22/2018
Schedule Variance	0 year(s), 1 month(s), 9 day(s)

Cost Summary Table

Project Sanction Summary ($M)

	Breakdown	Total Actual Spend	Original Project Sanction	Variance (Over) / Under

			Approval	
	Capex	0.637	0.913	0.276
	Opex	0.336	0.394	0.058
	Removal	0.000	0.000	0.000
	Total	0.973	1.307	0.334

Cost Variance Analysis

Underspend for INVP 5108 is due to on schedule delivery resulting in the project team not using any risk and the resources were able to work more quickly than expected which resulted in a reduction in forecasted resource allocations. Also, there was underspend on software verses what was estimated at sanction due to a reduced volume of users for Visual Studio Team Services.

Final Cost by Project

Actual Spending ($M) vs. Sanction ($M)

Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
5108	Capex	0.637	0.913	0.276
	Opex	0.336	0.394	0.058
	Removal	0.000	0.000	0.000
	Total	0.973	1.307	0.334

Project Sanction Summary ($M)

	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Total	Capex	0.637	0.913	0.276
	Opex	0.336	0.394	0.058
	Removal	0.000	0.000	0.000
	Total	0.973	1.307	0.334

Improvements / Lessons Learned

LL - 700 Planning - Upfront planning & workshops to walk-through plan & approach; including RACI provided team to expeditiously progress through tasks lead to the project being delivered on time and under budget

LL - 703 Deployment Planning - Project team defined a Deployment Plan early, having walk-throughs with project team and Deployment Readiness communications ensured the project was delivered on time.

Closeout Activities

ACTIVITY	COMPLETED
All work has been completed in accordance with all National Grid policies	(●) Yes ( ) No
Gate E checklist completed (appl. only to CCD)	( ) Yes (●) N/A
All relevant costs have been charged to project	(●) Yes ( ) No
All work orders and funding projects have been closed	(●) Yes ( ) No
All unused material have been returned	(●) Yes ( ) No
All as-builts have been completed	(●) Yes ( ) No
All lessons learned have been entered appropriately into the lesson learned database	(●) Yes ( ) No

Statement of Support

Department	Individual	Responsibilities
Business Department	Vaughn, John V.	Business Representative
Business Partner (BP)	Costa, Andrea	Relationship Manager
Program Delivery Management (PDM)	Mcnaught, Michelle	Program Delivery Director
IT Finance	Harris, Michelle	Manager
IT Regulatory	Gill, Thomas F.	Manager
Digital Risk and Security (DR&S)	Mandel, Marc	Manager
Service Delivery	Mirizio, Mark	Manager
Enterprise Architecture	Clinchot, Joseph J.	Director
Enterprise Portfolio Management	Cronin, Daniel	Analyst

Reviewers

Function	*Individual*
Regulatory	Mancinelli, Lauri A.
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Smith, Amy
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

Decisions

I approve this paper.

Signature _____

Date 8/14/19

David H. Campbell, Vice President US Treasury, USSC Chair

Appendix

N/A

nationalgrid

Closure: US Sanction Paper

Title:	NE IPC Phone Upgrade	Sanction Paper #:	
Project #: Capex #:	INVP 5120 S007894	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	7/30/2019
Author:	Matthews, Morgan Drury, Elisabeth	Sponsor(s):	Spink, John W. VP Control Centre Ops
Utility Service:	IT	Project Manager:	Drury, Elisabeth

Executive Summary

This paper is presented to close INVP 5120. The total spend was $0.896M. The original sanctioned amount for this project was $0.988M at +/- 10%.

Project Summary

This project upgraded the IPC phone system for control center operations at the Northborough and Lincoln facilities, encompassing a complete hardware and software upgrade. The factors driving the project included unsupported hardware and lack of a maintenance and support agreement between IPC and National Grid. IPC required an upgrade to an existing system in order to sign a new maintenance agreement. A failure to upgrade the IPC phone system would have resulted in the control centers using communication equipment that was not supported by the vendor and potential regulatory impacts should the equipment become inoperative.

Schedule Variance Table

	Schedule Variance
Project Grade - Ready to use Date	11/30/2018
Actual Ready to use Date	2/15/2019
Schedule Variance	0 year(s), 2 month(s), 17 day(s)

Cost Summary Table

Project Sanction Summary ($M)

Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Capex	0.860	0.833	(0.027)
Opex	0.036	0.155	0.119
Removal	0.000	0.000	0.000
Total			

	0.896	0.988	0.092

Cost Variance Analysis

Expected project costs were reduced because using internal resources was more cost effective than using external resouces.

Final Cost by Project

Actual Spending ($M) vs. Sanction ($M)

Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
NE IPC Phone Upgrade	Capex	0.860	0.833	(0.027)
	Opex	0.036	0.155	0.119
	Removal	0.000	0.000	0.000
	Total	0.896	0.988	0.092

Project Sanction Summary ($M)

	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Total	Capex	0.860	0.833	(0.027)
	Opex	0.036	0.155	0.119
	Removal	0.000	0.000	0.000
	Total	0.896	0.988	0.092

Improvements / Lessons Learned

- Contract negotiation: Security Policy and Standards – Identify up front, all Security groups that may be needed to address relevant Security policy and Standards when contested by the vendor. (Create Workshop)
- Design expansion of IPC capabilities clearly communicated to Exacom to insure understanding and impact
- More open access to the CNI Business, project team
- Broad communication of go-live to the Users
- Training of users – planned train the trainer vs one on one/small group training

Closeout Activities

ACTIVITY	COMPLETED
All work has been completed in accordance with all National Grid policies	◉ Yes ○ No
Gate E checklist completed (appl. only to CCD)	○ Yes ◉ N/A
All relevant costs have been charged to project	◉ Yes ○ No
All work orders and funding projects have been closed	◉ Yes ○ No
All unused material have been returned	◉ Yes ○ No
All as-builts have been completed	◉ Yes ○ No
All lessons learned have been entered appropriately into the lesson learned database	○ Yes ◉ No

Statement of Support

Department	Individual	Responsibilities
Business Department		Business Representative

	Spink, John W.	
Business Partner (BP)	Davidson, Caitlin	Relationship Manager
Program Delivery Management (PDM)	Campbell, Douglas	Program Delivery Director
IT Finance	Harris, Michelle	Manager
IT Regulatory	DeMauro, Daniel J.	Director
Digital Risk and Security (DR&S)	Mandel, Marc	Manager
Service Delivery	Mirizio, Mark	Manager
Enterprise Architecture	Clinchot, Joseph J.	Director
Enterprise Portfolio Management	Cronin, Daniel	Analyst

Reviewers

Function	*Individual*
Regulatory	Mancinelli, Lauri A.
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Smith, Amy
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

Decisions

The US ITSC Sanctioning Committee and Executive Sponsor has reviewed and approved this paper.

Signature _____

Date 08/01/19

Premjith Singh
VP IT EPMO

Appendix

N/A

Closure Paper

Title:	Add Effective Date to CSS	**Sanction Paper #:**	
Project #:	INVP 5132 Capex: S007823	**Sanction Type:**	Closure
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	3/29/2019
Author:	Dan Luby/Mike Pawlowski	**Sponsor:**	Jody Allison
Utility Service:	IT	**Project Manager:**	Dan Luby/Mike Pawlowski

1 Executive Summary

This paper is presented to close INVP5132. The total spend was $0.333M. The original sanctioned amount for this project was $0.377M at +/- 10%.

2 Project Summary

The project objectives were to process customer payments that are transmitted from specific financial institutions to use the actual date payments were made to the vendor instead of the date the payments are processed in the Customer Service System (CSS) as the effective date.

3 Variance Analysis

3.1 Cost Summary Table

Project Sanction Summary ($M)				
INVP 5132	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Add Effective Date to CSS	Capex	0.267	0.299	0.032
	Opex	0.066	0.078	0.012
	Removal	0.000	0.000	0.000
	Total	**0.333**	**0.377**	**0.044**

3.2 Cost Variance Analysis

The project variation reflects a reduction in overall effort due to a reduction of scope. The decision was made during the D&I phase. The business stakeholders reduced the number of financial institutions whose payments were included in the original estimates.

The project cost variance is within tolerance,

Closure Paper

3.3 Schedule Variance Table

Schedule Variance	
Project Grade - Ready for Use Date	9/30/2018
Actual Ready for Use Date	9/28/2018
Schedule Variance	- 0 years, 0 months, 2 days

3.4 Schedule Variance Explanation

N/A

4 Final Cost by Project

Actual Spending ($M) vs. Sanction ($M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
INVP 5132	Capex	0.267	0.299	0.032
	Opex	0.066	0.078	0.012
	Removal	0.000	0.000	0.000
	Total	**0.333**	**0.377**	**0.044**

Actual Spending ($M) vs. Sanction ($M)				
Total	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
	Capex	0.267	0.299	0.032
	Opex	0.066	0.078	0.012
	Removal	0.000	0.000	0.000
	Total	**0.333**	**0.377**	**0.044**

5 Improvements / Lessons Learned/Root Cause

2018-LL-622 – Engage payment vendors prior to or during start up to confirm their ability to support project work.

Closure Paper

6 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	(•) Yes ( ) No
Gate E checklist completed (appl. only to CCD)	( ) Yes (•) N/A
All relevant costs have been charged to project	(•) Yes ( ) No
All work orders and funding projects have been closed	(•) Yes ( ) No
All unused materials have been returned	(•) Yes ( ) No
All IT Service Transition activities have been completed	(•) Yes ( ) No
All lessons learned have been entered appropriately into the IT Knowledge Management Tool (KMT) lesson learned database	(•) Yes ( ) No

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Lee Smith	Business Representative
Business Partner (BP)	Joel Semel	Relationship Manager
Business Partner (BP)	Bob Lorkiewicz	Relationship Manager
Program Delivery Management (PDM)	Mike Pawlowski	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan DeMauro	Director IT Regulatory
Digital Risk and Security (DR&S)	Elaine Wilson	Director DR&S
Service Delivery	Jim Lozito	Service Owner
Enterprise Architecture	Joe Clinchot	Director Enterprise Architecture

Closure Paper

7.2 Reviewers

N/A

8 Decisions

The US ITSC Sanctioning Committee and Executive Sponsor has reviewed and approved this paper.

Signature……..Date…….

Premjith Singh
VP IT Tower Lead

US Sanction Paper

Title:	Data Center Buildout – Hicksville	**Sanction Paper #:**	USSC-18-314
Project #:	INVP 5154 Capex #: S007972	**Sanction Type:**	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	10/16/2018
Author:	Ginelle Davidson	**Sponsor:**	Barry Sheils, Vice President of Infrastructure and Operations
Utility Service:	IT	**Project Manager:**	Ginelle Davidson

1 Executive Summary

1.1 *Sanctioning Summary*

This paper requests partial sanction of INVP 5154 in the amount of $1.675M with a tolerance of +/- 10% for the purposes of Requirements and Design.

This partial sanction amount is $1.675M broken down into:

$0.150M Capex
$1.500M Opex
$0.025M Removal

NOTE the potential investment of $4.605M with a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of Requirements and Design.

1.2 *Project Summary*

This project is required to review and migrate or remove, where possible, all remaining equipment (ex. servers, storage, hardware/software, etc.) from the US Hicksville Data Center and migrate to the DXC data centers in Norwich, Connecticut and Newark, Delaware.

This project is needed to mitigate cyber security risk of legacy equipment.

This project also adheres to National Grid's data center strategy of migrating from internal data centers to external data centers.

The project scope includes evaluation and recommendation of all corporate applications.

Critical Network Infrastructure (CNI) applications are out of scope.

US Sanction Paper

1.3 *Summary of Projects*

Project Number	Project Type (Elec only)	Project Title	Estimate Amount ($M)
5154		Data Center Buildout - Hicksville	4.605
		Total	4.605

1.4 *Associated Projects*

N/A

1.5 *Prior Sanctioning History*

N/A

1.6 *Next Planned Sanction Review*

Date (Month/Year)	Purpose of Sanction Review
March 2019	Project Sanction

1.7 *Category*

Category	Reference to Mandate, Policy, NPV, or Other
○ Mandatory ○ Policy- Driven ○ Justified NPV ◉ Other	This project is needed to mitigate cyber security risk of legacy equipment. This project also adheres to National Grid's data center strategy of migrating from internal data centers to external data centers ensuring corporate applications are hosted in a supported environment with defined Service Levels.

1.8 *Asset Management Risk Score*

Asset Management Risk Score: 46

Primary Risk Score Driver: (Policy Driven Projects Only)

○ Reliability ○ Environment ○ Health & Safety ◉ Not Policy Driven

US Sanction Paper

1.9 *Complexity Level*

○ High Complexity ◉ Medium Complexity ○ Low Complexity ○ N/A

Complexity Score: 19

1.10 *Process Hazard Assessment*

A Process Hazard Assessment (PHA) is required for this project:

○ Yes ◉ No

1.11 *Business Plan*

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan ($)
IT Investment Plan FY19-23	◉ Yes ○ No	◉ Over ○ Under ○ NA	$1.605

1.12 *If cost > approved Business Plan how will this be funded?*

Re-allocation of budget within the IT business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 *Current Planning Horizon*

US Sanction Paper

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.150	0.246	0.000	0.000	0.000	0.000	0.396
OpEx	0.000	1.500	2.559	0.000	0.000	0.000	0.000	4.059
Removal	0.000	0.025	0.125	0.000	0.000	0.000	0.000	0.150
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	1.675	2.930	0.000	0.000	0.000	0.000	4.605

1.14 *Key Milestones*

Milestone	**Target Date: (Month Year)**
Start Up	July 2018
Partial Sanction	October 2018
Begin Requirements and Design	October 2018
Project Sanction (Full Sanction)	March 2019
Begin Development and Implementation	April 2019
Move to Production / Last Go Live	December 2019
Project Closure	March 2020

1.15 *Resources, Operations and Procurement*

Resource Sourcing			
Engineering & Design Resources to be provided	☑ Internal		☑ Contractor
Construction/Implementation Resources to be provided	☑ Internal		☑ Contractor
Resource Delivery			
Availability of internal resources to deliver project:	○ Red	○ Amber	◉ Green
Availability of external resources to deliver project:	○ Red	○ Amber	◉ Green
Operational Impact			
Outage impact on network system:	○ Red	○ Amber	◉ Green
Procurement Impact			
Procurement impact on network system:	○ Red	○ Amber	◉ Green

US Sanction Paper

1.16 *Key Issues (include mitigation of Red or Amber Resources)*

N/A

1.17 *Climate Change*

Contribution to National Grid's 2050 80% emissions reduction target:	◉ Neutral	○ Positive	○ Negative
Impact on adaptability of network for future climate change:	◉ Neutral	○ Positive	○ Negative

1.18 *List References*

N/A

2 Decisions

I:

(a) APPROVE this paper and the investment of $1.675M and a tolerance of +/-10% for the purposes of Requirements and Design

(b) NOTE the potential investment $4.605 and a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of requirements and design.

(c) NOTE that Ginelle Davidson is the Project Manager and has the approved financial delegation.

Signature……..Date…….

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair

3 Sanction Paper Detail

Title:	Data Center Buildout – Hicksville	**Sanction Paper #:**	USSC-18-314
Project #:	INVP 5154 Capex #: S007972	**Sanction Type:**	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	10/17/2018
Author:	Ginelle Davidson	**Sponsor:**	Barry Sheils, Vice President of Infrastructure and Operations
Utility Service:	IT	**Project Manager:**	Ginelle Davidson

3.1 *Background*

The current hardware located in the Hicksville US datacenter is aged. Old technology is more likely to incur an outage due to failed hardware components and is likely to experience difficulties returned to service on power-up. It is also more vulnerable to security risks due to out dated security. Continuing to keep old technology increases risk and the completion of this project will help mitigate this risk.

3.2 *Drivers*

This project is needed to mitigate cyber security risk of legacy equipment. This project also adheres to National Grid's data center strategy of migrating from internal data centers to external data centers ensuring corporate applications are hosted in a supported environment with defined Service Levels.

3.3 *Project Description*

This project is required to review and migrate/remove, where possible, all remaining equipment (ex. servers, storage, hardware/software, etc.) from the US Hicksville Data Center and migrate to the DXC data centers in Norwich, Connecticut and Newark, Delaware.

The project scope includes the evaluation and recommendation for all corporate applications.

CNI applications are out of scope.

3.4 *Benefits Summary*

Qualitative Benefits

- Modernized data center environment

- Applications will be hosted on supported hardware
- This project will enable the decommissioning of legacy applications, and the related hardware, that are currently not in use
- This project will reduce the data center footprint in Hicksville in alignment with the National Grid data center strategy ensuring corporate applications are hosted in a supported environment with defined Service Levels.

3.5 *Business and Customer Issues*

There are no significant business issues beyond what has been described elsewhere.

3.6 *Alternatives*

Alternative 1: Do nothing – Not selected. This option does not address the need to reduce the data center footprint in Hicksville NY which mitigates the cyber security risk related to maintaining unsupported, end of life hardware and operating systems.

Alternative 2: Defer investment – Not selected. This option does not mitigate the current level of cyber security risk related to maintaining unsupported, end of life hardware and operating systems.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant issues beyond what has been described elsewhere.

3.8 *Execution Risk Appraisal*

US Sanction Paper

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	There is a risk that there will be supplier changes due to upcoming contract expiration dates and ongoing negotiations	3	3	3	9	9	Mitigate	Manage the project toward completion	Project schedule and cost may be affected if there are significant contract changes	Work closely with the commercial teams to keep abreast of any expected changes and plan accordingly.
2	Work stoppage may limit the days that Gas Business related applications can be migrated	3	2	2	6	6	Mitigate	Manage business expectations and plan accordingly	Project schedule may be affected	Monitor the work stoppage status throughout the project. Work closely with the respective business application owners to plan and schedule application migrations.
3	There is a risk that applications, data and/or hardward will be identified as Legal Hold.	3	3	4	9	12	Mitigate	Manage the project toward completion	Project scope may change if Legal Hold items are identified. Legal Hold items may be left in place in the Hicksville data center	There is an understanding that the Hicksville data center will not be closed. Legal Hold items can be left in place.
4	Project timeline will be negatively impacted if there are delays completing the santioning process	2	2	2	4	4	Mitigate	Engage early with sanction stakeholders and follow up.	Project schedule may be at risk	Monitor the progress of the sanction workflows and approvals.

3.9 *Permitting*

N/A

3.10 *Investment Recovery*

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

US Sanction Paper

3.11 *Financial Impact to National Grid*

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend ($M)	Prior Yrs	Current Planning Horizon Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	Total
5154	Data Center Buildout - Hicksville	Est Lvl (e.g. +/- 10%)	CapEx	0.000	0.150	0.246	0.000	0.000	0.000	0.000	0.396
			OpEx	0.000	1.500	2.559	0.000	0.000	0.000	0.000	4.059
			Removal	0.000	0.025	0.125	0.000	0.000	0.000	0.000	0.150
			Total	0.000	1.675	2.930	0.000	0.000	0.000	0.000	4.605
Total Project Sanction			CapEx	0.000	0.150	0.246	0.000	0.000	0.000	0.000	0.396
			OpEx	0.000	1.500	2.559	0.000	0.000	0.000	0.000	4.059
			Removal	0.000	0.025	0.125	0.000	0.000	0.000	0.000	0.150
			Total	0.000	1.675	2.930	0.000	0.000	0.000	0.000	4.605

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.600	0.600	0.000	0.000	0.000	0.000	1.200
OpEx	0.000	0.900	0.900	0.000	0.000	0.000	0.000	1.800
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	1.500	1.500	0.000	0.000	0.000	0.000	3.000

Variance (Business Plan-Project Estimate)

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.450	0.354	0.000	0.000	0.000	0.000	0.804
OpEx	0.000	(0.600)	(1.659)	0.000	0.000	0.000	0.000	(2.259)
Removal	0.000	(0.025)	(0.125)	0.000	0.000	0.000	0.000	(0.150)
Total Cost in Bus. Plan	0.000	(0.175)	(1.430)	0.000	0.000	0.000	0.000	(1.605)

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the standard IS estimating methodology which includes an assessment of project resource needs based on the requirements of the project. Examples of these resource needs include hardware, software, internal and contract labor required to deliver the project. The accuracy level of estimate for each project is identified in Table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

N/A

3.11.4.1 *NPV Summary Table*

N/A

3.11.4.2 *NPV Assumptions and Calculations*

N/A

3.11.5 Additional Impacts

N/A

3.12 *Statements of Support*

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Barry Sheils	Business Representative
PDM	Helen Smith	Head of PDM
BRM	Brian Detota	Relationship Manager
PDM	Chris Granata	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan Demauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Svetlana Lyba	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 *Sanction Request Breakdown by Project*

$M	5154	Total
CapEx	0.150	0.150
OpEx	1.500	1.500
Removal	0.025	0.025
Total	1.675	1.675

US Sanction Paper

4.2 *Other Appendices*

4.2.1 Project Cost Breakdown

Project Cost Breakdown $ (millions)					
Cost Category	**sub-category**	**VOWD**	**FTC**	**FAC=VOWD+FTC**	**Name of Firm(s) providing**
Personnel	NG Resources	0.009	0.968	0.977	
	SDC Time & Materials	0.000	0.197	0.197	IBM
		0.000	0.382	0.382	WiPro
		0.000	1.555	1.555	DXC
		0.000	0.484	0.484	Verizon
	SDC Fixed-Price	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	All other personnel	0.000	0.150	0.150	
	TOTAL Personnel Costs	**0.009**	**3.736**	**3.745**	
Hardware	Purchase	0.000	-	-	
	Lease	0.000	-	-	
Software		0.000	-	-	
Risk Margin			0.784	0.784	
AFUDC		0.000	0.035	0.035	
Other		0.000	0.040	0.040	
TOTAL Costs		0.009	4.596	4.605	Should match Financial Summary Total

4.2.2 Benefiting Operating Companies

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Narragansett Electric Company	Electric Distribution	RI
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
New England Power Company – Transmission	Transmission	MA, NH, RI, VT
KeySpan Generation LLC (PSA)	Generation	NY
Narragansett Gas Company	Gas Distribution	RI
Colonial Gas Company	Gas Distribution	MA
Narragansett Electric Company – Transmission	Transmission	RI

US Sanction Paper

National Grid USA Parent	Parent	
Nantucket Electric Company	Electric Distribution	MA
NE Hydro - Trans Electric Co.	Inter Connector	MA, NH
New England Hydro Finance Company Inc.	Inter Connector	MA, NH
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Port Jefferson Energy Center	Generation	NY
New England Hydro - Trans Corp.	Inter Connector	MA, NH
KeySpan Services Inc.	Service Company	
KeySpan Glenwood Energy Center	Generation	NY
Massachusetts Electric Company – Transmission	Transmission	MA
NG LNG LP Regulated Entity	Gas Distribution	MA, NY, RI
Transgas Inc	Non-Regulated	NY
Keyspan Energy Trading Services	Other	NY
KeySpan Energy Corp.	Service Company	
New England Electric Trans Corp	Inter Connector	MA

4.2.3 IT Ongoing Operational Costs (RTB):

There is no impact to RTB for this project.

4.3 *NPV Summary (if applicable)*

N/A

4.4 *Customer Outreach Plan*

N/A

Closure Paper

Title:	Customer Data Visualization: Distributed Generation	**Sanction Paper #:**	
Project #:	INVP 5167	**Sanction Type:**	Closure
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	11/2/2018
Author:	Brendan Mahoney / Thomas Towne	**Sponsor:**	Terry Sobolewski
Utility Service:	IT	**Project Manager:**	Brendan Mahoney / Thomas Towne

1 Executive Summary

This paper is presented to close INVP 5167. The total spend was $0.392M. The original sanctioned amount for this project was $0.581M at +/- 10%.

The final spend amount is $0.392M broken down into:

$0.375M Capex
$0.017M Opex
$0 Removal

2 Project Summary

Building upon the success of the Data Visualization (Tableau) core implementation last year, this investment expanded its use with additional data and analytics capabilities. Customer Data Visualization: Distributed Generation built out a data mart and dashboard in support of DG business unit's reporting, data retention and regulatory obligations. In addition to enhanced data access, the investment provided advanced analytics through the use of new tools and longer term storage of information within a data warehousing environment. Requirements for the data sources, data mart, dashboard and reports were provided by a representative from the DG business group, and DG users were consulted by the implementation vendor in an agile approach during their development. The final displays and functionality of the dashboard was approved by the users before go-live. Enabling and user requirements were met and the dashboard, reports and data mart were successfully deployed on time. The project was a success.

Closure Paper

3 Variance Analysis

3.1 Cost Summary Table

Project Sanction Summary ($M)				
INVP 5167	**Breakdown**	**Total Actual Spend**	**Original Project Sanction Approval**	**Variance (Over) / Under**
Customer Data Visualization: Distributed Generation	**Capex**	0.375	0.543	0.168
	Opex	0.017	0.038	0.021
	Removal	0.000	0.000	0.000
	Total	**0.392**	**0.581**	**0.189**

3.2 Cost Variance Analysis

For Capex spending, there was a variance between the original sanctioned amount of $0.0543M and the actual expenditure of $0.375M, which falls 31% below the total sanctioned amount. The final difference of $0.168M can be attributed to the following sanctioned, but unused, expenses: SI vendor expenses ($0.034M), Unplanned partner support ($0.058M), Capex risk ($0.046M), National Grid & Contractor labor (roughly $0.016M), and some minor variations in vendor expenditures (roughly $0.004M). These together account for $0.158M of the unused sanctioned Capex amount.

For Opex spending, there was a variance between the original sanctioned amount of $0.038M and the actual expenditure of $0.017 which falls 56% below the sanctioned amount. Much of this $0.021M variation can be attributed to the $0.002M of unused Opex Risk costs. Other than the risk costs, Opex expenses totaled less than the original sanctioned amount by roughly $0.019M.

The vendor and all NG & contractor labor were able to fulfill the deliverables of this project at a final expenditure lower than the original sanctioned amount. The unused forecasted costs listed above (e.g. SI vendor expenses, unplanned partner support, etc.) did not materialize because the vendor did not require these expenses to deliver the final product. The statement of work was fulfilled, and the DG data mart, dashboard, and DG reports were successfully delivered on time.

3.3 Schedule Variance Table

Schedule Variance	
Project Grade – Ready for Use Date	**03/31/2018**
Actual Ready for Use Date	**03/31/2018**
Schedule Variance	**0 years, 0 months, 0 days**

Closure Paper

3.4 Schedule Variance Explanation

4 Final Cost by Project

Actual Spending ($M) vs. Sanction ($M)				
Customer Data Visualization: Distributed Generation	**Breakdown**	**Total Actual Spend**	**Original Project Sanction Approval**	**Variance (Over) / Under**
INVP 5167	**Capex**	0.375	0.543	0.168
	Opex	0.017	0.038	0.021
	Removal	0.000	0.000	0.000
	Total	**0.392**	**0.581**	**0.189**

5 Improvements / Lessons Learned/Root Cause

- IT Knowledge Management Tool (KMT) lesson learned database links:
  - 2018-LL-612
  - 2018-LL-613
  - 2018-LL-615

Lessons Learnt Log - 5167 DG.xls

Please reference the attached Lessons Learnt Log. Some of the lessons learnt are related to process—namely, the process of applying National Grid's Solution Delivery Framework (SDF) to a project pursuing an Agile approach. The Agile nature of this project required more flexibility in completing documentation. For example, an overall enabling requirements document was coupled with functional requirements documents and design documents for each of the dashboards, in lieu of an overarching Business Requirements Document. In essence, some aspects of the SDF will have to change when completing an Agile project, but required elements must be met by alternative means if necessary, and proper approvals of those alternative means must be made by all the necessary stakeholders.

6 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	(•) Yes ( ) No

Closure Paper

Gate E checklist completed (appl. only to CCD)	○ Yes ◉ N/A
All relevant costs have been charged to project	◉ Yes ○ No
All work orders and funding projects have been closed	◉ Yes ○ No
All unused materials have been returned	◉ Yes ○ No
All IT Service Transition activities have been completed	◉ Yes ○ No
All lessons learned have been entered appropriately into the IT Knowledge Management Tool (KMT) lesson learned database	◉ Yes ○ No

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Gregory Bergelson	Business Representative
Program Delivery ManagementPDM	Narayan Devireddy	Vice President IT, Solution Delivery
Business Partner (BP)	Joel Semel	Relationship Manager
Program Delivery Management (PDM)	Jeff Dailey	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Peter Shattuck	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

7.2 Reviewers

This section is relevant only for USSC projects. Not applicable to this project.

Closure Paper

8 Decisions

The US ISSC Sanctioning Committee and Executive Sponsor has reviewed and approved this paper.

Signature……..Date…….

Premjith Singh

VP IT Tower Lead, Ops & Network

US Sanction Paper

Title:	NY Gas Service Line Inspection	**Sanction Paper #:**	USSC -18-260 v2
Project #:	INVP 5175 Capex: S007905	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	12/11/2018
Author:	Ashok Vallapu / William Myles	**Sponsor:**	Timothy Graham VP of Customer Meter Services
Utility Service:	IT	**Project Manager:**	Ashok Vallapu / William Myles

1 Executive Summary

1.1 *Sanctioning Summary*

This paper requests sanction of INVP 5175 in the amount of $1.349 M with a tolerance of +/- 10% for the purposes of Full Implementation

This sanction amount is $1.349 M broken down into:

$ 0.994 M Capex
$ 0.355 M Opex
$0.000 M Removal

1.2 *Project Summary*

The New York State Public Service Commission (PSC) issued an Order on 04/20/2017 in Case 15-G-0244 requiring all New York Local Distribution Companies (LDCs) to inspect all inside jurisdictional piping (Gas Service Line) to the outlet of the meter for leaks and substandard conditions and confirm that all meter/services are authorized. As a result, National Grid needs to complete approximately 74K annual inspections for Niagara Mohawk, 153K for The Brooklyn Union Gas Company and 106K for KeySpan Gas East Corporation.
This project will implement a solution from The Sequel Group (TSG) that provides the capability for the Customer Meter Services (CMS) function to complete Gas Service Line Inspections in the field. The solution also provides the capability to schedule appointments and collect and report appointment and inspection data to the PSC. The solution will be used by National Grid employees and contractors and will comply with Digital Risk & Security requirements.

1.3 *Summary of Projects*

Project Number	Project Type (Elec only)	Project Title	Estimate Amount ($M)
INVP 5175	Project Type	NY Gas Service Line Inspection	1.349
		Total	1.349

US Sanction Paper

1.4 *Associated Projects*

N/A

1.5 *Prior Sanctioning History*

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
8/2/18	USSC	$0.639M	2.001M	Partial	25%

1.6 *Next Planned Sanction Review*

Date (Month/Year)	Purpose of Sanction Review
June 2019	Project Closure Sanction

1.7 *Category*

Category	Reference to Mandate, Policy, NPV, or Other
○ Mandatory ○ Policy- Driven ○ Justified NPV ◉ Other	PSC Mandate CASE 15-G-0244: Proceeding on Motion of the Commission to Develop Implementation Protocols for Complying with Inspection Requirements Pertaining to Gas Service Lines Inside Buildings.

1.8 *Asset Management Risk Score*

Asset Management Risk Score: _45__

Primary Risk Score Driver: (Policy Driven Projects Only)

○ Reliability ○ Environment ○ Health & Safety ◉ Not Policy Driven

1.9 *Complexity Level*

○ High Complexity ○ Medium Complexity ◉ Low Complexity ○ N/A

US Sanction Paper

Complexity Score: _16__

1.10 *Process Hazard Assessment*

A Process Hazard Assessment (PHA) is required for this project:

○ Yes ◉ No

1.11 *Business Plan*

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan ($)
IS Investment Plan FY19-23	◉ Yes ○ No	○ Over ◉ Under ○ NA	$0.736

1.12 *If cost > approved Business Plan how will this be funded?*

N/A

1.13 *Current Planning Horizon*

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.994	0.000	0.000	0.000	0.000	0.000	0.994
OpEx	0.000	0.347	0.008	0.000	0.000	0.000	0.000	0.355
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	1.341	0.008	0.000	0.000	0.000	0.000	1.349

1.14 *Key Milestones*

Milestone	Target Date: (Month Year)
Start Up	March 2018
Partial Sanction	August 2018
Begin Requirements and Design	July 2018
Project Sanction	December 2018
Begin Development and Implementation	December 2018
Begin User Acceptance Testing	February 2019
Move to Production / Last Go Live	March 2019
Project Closure	June 2019

1.15 *Resources, Operations and Procurement*

Resource Sourcing			
Engineering & Design Resources to be provided	☑ Internal		☑ Contractor
Construction/Implementation Resources to be provided	☑ Internal		☑ Contractor
Resource Delivery			
Availability of internal resources to deliver project:	○ Red	○ Amber	◉ Green
Availability of external resources to deliver project:	○ Red	○ Amber	◉ Green
Operational Impact			
Outage impact on network system:	○ Red	○ Amber	◉ Green
Procurement Impact			
Procurement impact on network system:	○ Red	○ Amber	◉ Green

1.16 *Key Issues (include mitigation of Red or Amber Resources)*

N/A

1.17 *Climate Change*

Contribution to National Grid's 2050 80% emissions reduction target:	◉ Neutral	○ Positive	○ Negative
Impact on adaptability of network for future climate change:	◉ Neutral	○ Positive	○ Negative

1.18 *List References*

N/A

2 Decisions

I:

(a) APPROVE this paper and the investment of $1.349M and a tolerance of +/-10% for the purposes of Full Implementation

(b) APPROVE the run-the-business (RTB) of $0.081M (per annum) for 5 years.

(c) NOTE that William Myles is the Project Manager and has the approved financial delegation.

Signature……..Date…….

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair

3 Sanction Paper Detail

Title:	NY Gas Service Line Inspection	**Sanction Paper #:**	USSC-18-260 v2
Project #:	INVP 5175 S007905	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	12/11/2018
Author:	Ashok Vallapu / William Myles	**Sponsor:**	Timothy Graham
Utility Service:	IT	**Project Manager:**	Ashok Vallapu / William Myles

3.1 *Background*

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To comply with the Gas Service Line Inspection requirements, National Grid utilizes external contractors to perform the inspections. Outside contractors use different methods to collect inspection data making it difficult to collect and report on the information. Currently, there is no in-house solution which can be utilized by National Grid employees or contractors for performing inspection and reporting services. One solution/single method across employees and contractors will help achieve data standards and consistency in completing inspection along with improved oversight.

3.2 *Drivers*

National Grid Customer Meter Services need to complete mandated inspections through National Grid contractors and employees to meet PSC requirements. The PSC requirements also include records and reporting related to the inspections.

3.3 *Project Description*

The Service Line Inspection Mobile (SLIM) system consists of an Amazon Web Services Cloud hosted application (Fulcrum) provided by the vendor to perform the inspections, and facilitate PSC reporting, and appointment scheduling. The application will be maintained by The Sequel Group.

The solution will enhance the inspections and records of inspections of existing gas service lines

1. The solution was chosen to meet the requirements and delivery timeline set out in the PSC mandate.
2. Solution will create a standardized platform for the users to perform and record gas service line inspections

3. The solution will include appropriate user authentication, and authorization controls.
4. Solution will be integrated with the current service line inspection compliance solution for PSC reporting and data retention requirments
5. Solution will be utilized to schedule, record and report appointment information mandated by PSC
6. Training material and Support process for this solution will be enhanced as part of project delivery

3.4 *Benefits Summary*

- Common solution to perform inspections by National Grid employees and contractors
- Decreases dependency on external vendors to perform mandated inspection as the application is owned byNG and available to NG internal employees
- National Grid can manage quality and data standard for inspection by controlling application changes

3.5 *Business and Customer Issues*

There are no significant business issues beyond what has been described elsewhere.

3.6 *Alternatives*

Alternative 1: Not Selected - Do Nothing – Currently National Grid hires outside contractors to complete inspections on a solution that is owned and controlled by contractors. In addition, the inspection team cannot be scaled up with contractors alone as opposed to using National Grid CMS and Field Operations teams due to lack of solution availability. This option will limit National Grid's ability to handle the PSC required volume of inspections in a timely manner.

Alternative 2: Not Selected – In-house solution using National Grid mobile technologies. However, the platform infrastructure is not ready and will be expensive and time-consuming based on amount of work involved to setup environments and implementation practices and standing up of the support structure.

Alternative 3: Not Selected – Defer – This option includes deferring the solution and waiting for the Gas Business Enablement (GBE) team to deliver an adequate solution. Currently, the GBE team does not have plans to provide this capability, so the proposed solution will persist into the foreseeable future.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant issues beyond what has been described elsewhere.

3.8 *Execution Risk Appraisal*

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Since contractors are using their own devices to run the application, NG does not have a control on the data residing in contractor devices in events of device loss or damage	4	1	3	4	12	Accept	Business acceptance and DR&S acceptance	None	Business acceptance and DR&S acceptance
2	Delivery might be impacted if vendor does not provide the solution components in time	2	2	3	4	6	Mitigate	Coordinate with Vendor for clear expectation and manage the delivery as per business priority	Vendor is not able to provide the solution components as per business priority and defined schedule	Identify workarounds and take appropriate business approvals

3.9 *Permitting*

N/A

3.10 *Investment Recovery*

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 *Financial Impact to National Grid*

US Sanction Paper

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend ($M)	Prior Yrs	Current Planning Horizon Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	Total
INVP 5175	NY Gas Service Line Inspection	Est Lvl (+/- 10%)	CapEx	0.000	0.994	0.000	0.000	0.000	0.000	0.000	0.994
			OpEx	0.000	0.348	0.008	0.000	0.000	0.000	0.000	0.356
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.342	0.008	0.000	0.000	0.000	0.000	1.350
Total Project Sanction			CapEx	0.000	0.994	0.000	0.000	0.000	0.000	0.000	0.994
			OpEx	0.000	0.347	0.008	0.000	0.000	0.000	0.000	0.355
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.341	0.008	0.000	0.000	0.000	0.000	1.349

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

$M	Prior Yrs (Actual)	Current Planning Horizon Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	Total
CapEx	0.000	1.634	0.020	0.000	0.000	0.000	0.000	1.654
OpEx	0.000	0.418	0.013	0.000	0.000	0.000	0.000	0.431
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	2.052	0.033	0.000	0.000	0.000	0.000	2.085

Variance (Business Plan-Project Estimate)

$M	Prior Yrs (Actual)	Current Planning Horizon Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	Total
CapEx	0.000	0.640	0.020	0.000	0.000	0.000	0.000	0.660
OpEx	0.000	0.071	0.005	0.000	0.000	0.000	0.000	0.076
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.711	0.025	0.000	0.000	0.000	0.000	0.736

3.11.3 Cost Assumptions

N/A

3.11.4 Net Present Value / Cost Benefit Analysis

N/A

3.11.4.1 ***NPV Summary Table***

N/A

3.11.4.2 ***NPV Assumptions and Calculations***

N/A

3.11.5 Additional Impacts

N/A

3.12 *Statements of Support*

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
IT Business Partner (BP)	Prem Singh	Relationship Manager
Head of Delivery	Sally Seltzer	Program Delivery Director
Program Delivery Lead(s)	Sally Seltzer	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Finance	Jess Cheung	Finance Analyst
IT Regulatory	Tom Gill	Manager
Digital Risk and Security (DR&S)	Peter Shattuck	Manager
RTB Manager	Mark Mirizio	Director
Enterprise Architecture	Svetlana Lyba	Director
PPM Team	Marty Cronin	Manager

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 *Sanction Request Breakdown by Project*

4.2 *Other Appendices*

US Sanction Paper

4.2.1 Project Cost Breakdown

Project Cost Breakdown $ (millions)					
Cost Category	**sub-category**	**Value of Work to Date (VOWD)**	**Forecast to Complete (FTC)**	**Forecast At Completion (FAC=VOWD+FTC)**	**Name of Firm(s) providing resources**
Personnel	NG Resources	0.042	0.037	0.079	
	SDC Time & Materials	0.047	0.089	0.136	IBM
			0.095	0.095	WiPro
			-	-	DXC
			-	-	Verizon
	SDC Fixed-Price		-	-	IBM
			-	-	WiPro
			-	-	DXC
			-	-	Verizon
	All other personnel	0.235	0.594	0.829	
	TOTAL Personnel Costs	**0.324**	**0.815**	**1.139**	
Hardware	Purchase		-	-	
	Lease		-	-	
Software			0.081	0.081	
Risk Margin			0.065	0.065	
AFUDC			0.018	0.018	
Other		0.000	0.047	0.047	
TOTAL Costs		0.324	1.025	1.349	

4.2.2 Benefiting Operating Companies

Benefiting Operating Companies Table:

Operating Company Name	Business Area	State
Keyspan Energy Delivery - NY	Gas Distribution	NY
KeySpan Gas East Corporation (KEDLI)	Gas Distribution	NY
Niagara Mohawk Power Corp – Gas	Gas Distribution	NY

4.2.3 IS Ongoing Operational Costs (RTB):

This project will increase/decrease IS ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

US Sanction Paper

all figures in $ thousands						
INV ID:	5175				**Date RTB Last Forecasted**	11/20/2018
Investment Name:	NY Gas Service Line Inspection					
Project Manager:	Ashok Vallapu			**PDM:**	William Myles / Sally Seltzer	
All figures in $ thousands	**Yr. 1**	**Yr. 2**	**Yr. 3**	**Yr. 4**	**Yr. 5**	**Total**
	FY 18/19	**FY 19/20**	**FY 20/21**	**FY 21/22**	**FY 22/23**	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB						-
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB	115.0	371.0	379.0	401.0		**1,266.0**
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	-	**82.5**	**110.8**	**105.5**	**105.5**	**404.3**
Business Funded Net Impact to RTB Forecasted at Go-Live	**610.0**	**3,568.0**	**1,979.0**	**1,979.0**	**1,999.0**	**10,135.0**
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	115.0	288.5	268.2	295.5	(105.5)	861.7
Business Budgeted Net Impact to RTB Variance	(610.0)	(3,568.0)	(1,979.0)	(1,979.0)	(1,999.0)	(10,135.0)

The potential increase in RTB is due to:

- IT RTB includes Software as a Service (SaaS) costs for hardware and software
- IT RTB includes annual maintenance costs for new hardware and software required to run the new products
- IT RTB includes internal and external support services required for hardware and software
- Business RTB includes SaaS Licensing Costs, Appointment Scheduling costs and Machine Learning included Optical Content Recognition Processing costs
- Business RTB includes support services costs relating to business calls for inspection business process

4.3 *NPV Summary (if applicable)*

N/A

4.4 *Customer Outreach Plan*

N/A

US Sanction Paper

Title:	MA Smart Program	**Sanction Paper #:**	USSC-18-252 v2
Project #:	INVP 5177 Capex: S007898	**Sanction Type:**	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	12/4/2018
Author:	Susan Stallard Teders / Rick Malek	**Sponsor:**	Jody Allison, VP Billing and Collections Strategy
Utility Service:	IT	**Project Manager:**	Rick Malek / Riziel Cruz-Bower

1 Executive Summary

1.1 *Sanctioning Summary*

This paper requests partial sanction of INVP 5177 in the amount of $2.642M with a tolerance of +/- 10% for the purposes of Development and Implementation for Workstream 2 - Billing Automation and Workstream 3 - Banking Information.

This sanction amount is $2.642M broken down into:

$2.376M Capex
$0.266M Opex
$0.000M Removal

NOTE the potential investment of $3.000M with a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of Development and Implementation for Workstream 2 - Billing Automation; Workstream; and 3 - Banking Information. The final sanction for this project will be for Full Implementation of Workstream 4 - Reports, Anniversary Calculations.

1.2 *Project Summary*

Solar Massachusetts Renewable Target (SMART) is the latest revision to the distributed photovoltaic (PV) incentive program in Massachusetts. The SMART program encourages diverse deployment of solar capacity by size, location and customer/system beneficiaries through the use of rate incentives and adders.

This project is driven by National Grid's compliance with the Massachusetts Department of Public Utilities (DPU) net metering tariffs. Specifically, National Grid's billing system requires changes to existing billing calculations for net metering and the creation of automated new calculations between host and satellite meters.

US Sanction Paper

1.3 *Summary of Projects*

Project Number	Project Title	Estimate Amount ($M)
INVP 5177	MA SMART Program	3.000
	Total	3.000

1.4 *Associated Projects*

N/A

1.5 *Prior Sanctioning History*

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
6/26/18	USSC	$0.608M	$2.488M	Partial Sanction	+/- 25%

1.6 *Next Planned Sanction Review*

Date (Month/Year)	Purpose of Sanction Review
August 2019	Project Sanction

1.7 *Category*

Category	Reference to Mandate, Policy, NPV, or Other
◉ Mandatory ○ Policy- Driven ○ Justified NPV ○ Other	On August 25, 2017, the Department of Energy Resources' (DOER) final SMART Program regulations were published as 225 C.M.R. § 20.00 (the "SMART Regulations").

US Sanction Paper

1.8 *Asset Management Risk Score*

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

○ Reliability ○ Environment ○ Health & Safety ◉ Not Policy Driven

1.9 *Complexity Level*

◉ High Complexity ○ Medium Complexity ○ Low Complexity ○ N/A

Complexity Score: 25

1.10 *Process Hazard Assessment*

A Process Hazard Assessment (PHA) is required for this project:

○ Yes ◉ No

1.11 *Business Plan*

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan
IS Investment Plan FY19 - 23	◉ Yes ○ No	◉ Over ○ Under ○ NA	$1.080M

US Sanction Paper

1.12 *If cost > approved Business Plan how will this be funded?*

Re-allocation of budget within the IS business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 *Current Planning Horizon*

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.990	1.703	0.000	0.000	0.000	0.000	2.693
OpEx	0.000	0.229	0.078	0.000	0.000	0.000	0.000	0.307
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	1.219	1.781	0.000	0.000	0.000	0.000	3.000

1.14 *Key Milestones*

Milestone	**Target Date: (Month Year)**
Start Up	June 2018
Partial Sanction	June 2018
Begin Requirements and Design	July 2018
Partial Sanction	December 2018
Begin Development and Implementation	December 2018
Project Sanction	August 2019
Begin User Acceptance Testing	December 2019
Move to Production / Last Go Live	December 2019
Project Closure Sanction	March 2020

1.15 *Resources, Operations and Procurement*

Resource Sourcing		
Engineering & Design Resources to be provided	☑ Internal	☑ Contractor
Construction/Implementation Resources to be provided	☑ Internal	☑ Contractor
Resource Delivery		

Availability of internal resources to deliver project:	○ Red	○ Amber	◉ Green
Availability of external resources to deliver project:	○ Red	○ Amber	◉ Green
Operational Impact			
Outage impact on network system:	○ Red	○ Amber	◉ Green
Procurement Impact			
Procurement impact on network system:	○ Red	○ Amber	◉ Green

1.16 *Key Issues (include mitigation of Red or Amber Resources)*

N/A

1.17 *Climate Change*

Contribution to National Grid's 2050 80% emissions reduction target:	◉ Neutral	○ Positive	○ Negative
Impact on adaptability of network for future climate change:	◉ Neutral	○ Positive	○ Negative

1.18 *List References*

N/A

2 Decisions

I:

(a) APPROVE this paper and the investment of $2.642M and a tolerance of +/-10% for the purposes of Development and Implementation for Workstream 2 - Billing Automation and Workstream 3 - Banking Information.

(b) NOTE the potential run-the-business (RTB) will be determined prior to the final project sanctioning in August 2019.

(c) NOTE the potential investment $3.000M and a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of requirements and design.

(d) NOTE that Riziel Cruz-Bower is the Project Manager and has the approved financial delegation to undertake the activities stated in (a).

Signature……..Date…….

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair

3 Sanction Paper Detail

Title:	MA Smart Program	**Sanction Paper #:**	USSC-18-252 v2
Project #:	INVP 5177 Capex: S007898	**Sanction Type:**	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	12/4/2018
Author:	Susan Stallard Teders / Rick Malek	**Sponsor:**	Jody Allison, VP Billing and Collections Strategy
Utility Service:	IT	**Project Manager:**	Rick Malek / Riziel Cruz-Bower

3.1 *Background*

The goal of the SMART program is to encourage diversity in the deployment of 1,600MW alternating current (AC) of distributed generation (DG) solar in Massachusetts by size, location and customer/system beneficiaries through the use of rate incentives and adders.

The program, including system registration, approval, and incentive level determinations, will be managed by a third-party solar program administrator (SPA). The conveyance of incentives and benefits to customers will still be managed by and delivered through National Grid and its billing systems.

The SMART Program includes provisions for:

- Incentive payments for Renewable Portfolio Standard Class I Renewable Generation Attributes and/or Environmental Attributes produced by a Solar Tariff Generation Unit;
- Alternative On-Bill Credits for energy generated by an Alternative On-Bill Credit Generation Unit;
- The basis upon which Incentive Payments and Alternative On-Bill Credits are determined; and
- The recovery of any such Incentive Payments, Alternative On-Bill Credits, and incremental administrative costs associated with the implementation and operation of the SMART Program.

The MA SMART program will include association of a single generation meter with multiple account meters. The standalone generator meter is referred to as host while the associated accounts are satellites receiving the benefit of the host's generated

usage. The SMART program allows allocation to at least one satellite with no maximum limit of satellite accounts. The allocated percentage from a host to its satellites does not need to add up to 100%, but cannot exceed 100%.

3.2 *Drivers*

The primary driver for this project is compliance with the DOER's SMART Program regulations, published on August 25, 2017 in 225 C.M.R. § 20.00 (the "SMART Regulations").

3.3 *Project Description*

In Massachusetts, there are currently five different net metering calculations. National Grid uses several riders and calculations to determine the proper net metering credit to apply when a customer over generates. The current net metering program allows for monetary transfers from a host account to other satellite accounts. These transfers are percentage based and performed manually at this time. They will eventually be triggered automatically from the new Host/Satellite relationship window.

This MA SMART program will be applicable to five subgroups: (1) standalone net metering units; (2) standalone qualifying facilities; (3) standalone alternative on-bill credit units; (4) behind the meter net metering units; and (5) behind the meter non-net metered units. A new rider/contract in Customer Service System will be created to identify the five subgroups listed above. This rider/contract consists of a specific meter configuration for a client, incuding information such as rates and taxes. The rider/contract is then associated with the customer account and used to correctly calculate the charges and credits during the account billing process.

All generating units, including current net metered customers, must have a net meter installed. Metering requirements are driven by the provisions of the Interconnection Tariff (units over 60 kW will require interval meters and smaller units may need standard net meters). All standalone generators will be setup as rate G-1, which is the same as the current process. Behind the meter generators will have a meter separate from the on-site load meter. Ideally these accounts will be connected to the onsite load account for reporting purposes. In order to expedite the billing process these accounts can be set up as though they are standalone units.

Value of Energy (VOE) is calculated at the host account based on the generated kWh and transferred to the satellites based on percentage. For standalone units, the VOE transferred to satellites is based on the percentage indicated on the customer payment form. For behind the meter units, there will be no change in the current process. Customers will be billed via a net meter. Cash payment is calculated and paid only at the host account level.

This project is comprised of four workstreams:

- Workstream 1 – Manual Billing Setup

This workstream was implemented November 16, 2018.

- Workstream 2 – Billing Automation

This workstream is in Requirements and Design and will be targeting an implemention of September 2019.

- Workstream 3 – Banking Information

This workstream is in Requirements and Design and will be targeting an implemention of September 2019.

- Workstream 4 - Reports, Anniversary Calculations

The Company is defining the requirements for this workstream and the project is scheduled to begin Development in June 2019.

3.4 *Benefits Summary*

N/A

3.5 *Business and Customer Issues*

There are no additional business or customer issues beyond what has been described elsewhere in this paper.

3.6 *Alternatives*

Alternative 1: Do Nothing or Defer Project

This alternative is directly non-compliant with DPU SMART Regulations. Moreover, the increase number of SMART applications in Massachusetts during the fall 2018 calendar year will jeopardize the Company's ability to accurately bill accounts in a timely manner, due to the current process of manual account handling. Therefore, this alternative is not recommended.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significan safety, environmental or project planning issues beyond what has been described elsewhere in this paper.

3.8 *Execution Risk Appraisal*

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Code availability for development may be impacted by parallel projects	2	2	3	4	6	Mitigate	Coordinate with other project teams.	None.	None.
2	Scope may change as a result of business needs	2	2	2	4	4	Mitigate	Maintain dialog with business in regards to changing needs.	None.	None.
3	Testing may be impacted by business team availability	2	2	3	4	6	Mitigate	Work with Business team to schedule testing according to their availability.	None.	None.
4	Portal Integration may be added to scope adding complexity and cost	3	4	4	12	12	Mitigate	Business decision on including Portal integration will need to be added to scope	None.	None.

3.9 *Permitting*

N/A

3.10 *Investment Recovery*

3.10.1 *Investment Recovery and Regulatory Implications*

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 *Customer Impact*

N/A

3.10.3 *CIAC / Reimbursement*

N/A

US Sanction Paper

3.11 *Financial Impact to National Grid*

3.11.1 *Cost Summary Table*

					Current Planning Horizon						
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
Project Number	Project Title	Project Estimate Level (%)	Spend ($M)	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
INVP 5177	MA SMART Program	+/- 25%	CapEx	0.000	0.990	1.703	0.000	0.000	0.000	0.000	2.693
			OpEx	0.000	0.229	0.078	0.000	0.000	0.000	0.000	0.307
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.219	1.781	0.000	0.000	0.000	0.000	3.000

3.11.2 *Project Budget Summary Table*

Project Costs per Business Plan

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	1.654	0.000	0.000	0.000	0.000	0.000	1.654
OpEx	0.000	0.266	0.000	0.000	0.000	0.000	0.000	0.266
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	1.920	0.000	0.000	0.000	0.000	0.000	1.920

Variance (Business Plan-Project Estimate)

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.664	(1.703)	0.000	0.000	0.000	0.000	(1.039)
OpEx	0.000	0.037	(0.078)	0.000	0.000	0.000	0.000	(0.041)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.701	(1.781)	0.000	0.000	0.000	0.000	(1.080)

3.11.3 *Cost Assumptions*

The accuracy level of estimate for each project is identified in table 3.11.1.

3.11.4 *Net Present Value / Cost Benefit Analysis*

This is not an NPV project.

3.11.4.1 *NPV Summary Table*

N/A

3.11.4.2 *NPV Assumptions and Calculations*

N/A

3.11.5 *Additional Impacts*

N/A

3.12 *Statements of Support*

3.12.1 *Supporters*

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Jody Allison	VP, Billing & Collections
IT Global Solutions Development	Narayan Devireddy	VP, IT Global Solutions
IT Business Partner (BP)	Joel Semel	Director
IT Global Solutions Development	Riziel Cruz-Bower	Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Peter Shattuck	Lead Architect
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

3.12.2 *Reviewers*

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Maria Harvey
Jurisdictional Delegate - Electric NE	Patricia Easterly
Procurement	Diego Chevere

4 Appendices

4.1 *Sanction Request Breakdown by Project*

$M	INVP 5177	Total
CapEx	2.693	2.693
OpEx	0.307	0.307
Removal	0.000	0.000
Total	3.000	3.000

4.2 *Other Appendices*

4.2.1 *Project Cost Breakdown*

Project Cost Breakdown $ (millions)					
Cost Category	**sub-category**	**Value of Work to Date (VOWD)**	**Forecast to Complete (FTC)**	**Forecast At Completion (FAC=VOWD+FTC)**	**Name of Firm(s) providing resources**
Personnel	NG Resources		0.709	0.709	
	SDC Time & Materials		1.678	1.678	IBM
			-	-	WiPro
			-	-	DXC
			-	-	Verizon
	SDC Fixed-Price		-	-	IBM
			0.050	0.050	WiPro
			-	-	DXC
			-	-	Verizon
	All other personnel	0.195	-	0.195	
	TOTAL Personnel Costs	**0.195**	**2.437**	**2.632**	
Hardware	Purchase		-	-	
	Lease		-	-	
Software			-	-	
Risk Margin			0.209	0.209	
AFUDC			0.131	0.131	
Other			0.028	0.028	
TOTAL Costs		0.195	2.805	3.000	

4.2.2 Benefiting Operating Companies

Operating Company Name	Business Area	State
Massachusetts Electric Company	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA

4.2.3 IS Ongoing Operational Costs (RTB):

The projects Run the Business (RTB) costs are TBD and will be determined prior the final project sanctioning in August 2019.

4.3 *NPV Summary (if applicable)*

N/A

4.4 *Customer Outreach Plan*

N/A

US Sanction Paper

Title:	Nantucket Substation IS Network for Tesla Battery and Solar Micro Turbine	**Sanction Paper #:**	USSC-18-231v2
Project #:	INVP 5178 Capex: S007893	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	3/26/2019
Author:	Anthony Bussard	**Sponsor:**	Carol Sedewitz, VP Distribution Asset Management & Planning
Utility Service:	IT	**Project Manager:**	Anthony Bussard

1 Executive Summary

1.1 *Sanctioning Summary*

This paper requests sanction of INVP 5178 in the amount of $0.662M with a tolerance of +/- 10% for the purposes of Full Implementation.

This sanction amount is $0.662M broken down into:

$0.489M Capex
$0.173M Opex
$0.000M Removal

1.2 *Project Summary*

This project covers the planning, design and installation of the Corporate IT network components required to support the new Battery Energy Storage System (BESS) at the Bunker Road Nantucket Substation. As part of implementation of the new BESS, the vendor has been contracted to monitor and maintain their systems. This investment covers the IT portion of the project and will provide secure network connections and components to the systems to allow the vendor to remotely monitor and maintain the devices.

1.3 *Summary of Projects*

Project Number	Project Type (Elec only)	Project Title	Estimate Amount ($M)
5178	Project Type	Nantucket IS Network	0.662
		Total	0.662

US Sanction Paper

1.4 *Associated Projects*

N/A

1.5 *Prior Sanctioning History*

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
6/19/18	USSC	$0.438	$1.336M	Partial	+/- 25%

1.6 *Next Planned Sanction Review*

Date (Month/Year)	Purpose of Sanction Review
July 2019	Project Closure Sanction

1.7 *Category*

Category	Reference to Mandate, Policy, NPV, or Other
○ Mandatory ◉ Policy- Driven ○ Justified NPV ○ Other	Distribution Planning Criteria Strategy, Feb 2011 Nantucket Area Supply & Distribution Study, June 2016

1.8 *Asset Management Risk Score*

Asset Management Risk Score: __39___

Primary Risk Score Driver: (Policy Driven Projects Only)

◉ Reliability ○ Environment ○ Health & Safety ○ Not Policy Driven

US Sanction Paper

1.9 ***Complexity Level***

○ High Complexity ○ Medium Complexity ◉ Low Complexity ○ N/A

Complexity Score: 18

1.10 ***Process Hazard Assessment***

A Process Hazard Assessment (PHA) is required for this project:

○ Yes ◉ No

1.11 ***Business Plan***

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan ($)
IT Investment Plan FY20 - 24	◉ Yes ○ No	○ Over ○ Under ◉ NA	0.000

1.12 ***If cost > approved Business Plan how will this be funded?***

N/A

1.13 ***Current Planning Horizon***

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	Prior Yrs	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	Total
CapEx	0.256	0.233	0.000	0.000	0.000	0.000	0.000	0.489
OpEx	0.091	0.082	0.000	0.000	0.000	0.000	0.000	0.173
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.347	0.315	0.000	0.000	0.000	0.000	0.000	0.662

1.14 ***Key Milestones***

Milestone	Target Date: (Month Year)
Start Up	April 2018
Partial Sanction	June 2018

US Sanction Paper

Milestone	Target Date: (Month Year)
Begin Requirements and Design	June 2018
Project Sanction	March 2019
Begin Development and Implementation	March 2019
Begin User Acceptance Testing	May 2019
Move to Production / Last Go Live	May 2019
Project Closure	July 2019

1.15 *Resources, Operations and Procurement*

Resource Sourcing			
Engineering & Design Resources to be provided	☑ Internal		☑ Contractor
Construction/Implementation Resources to be provided	☑ Internal		☑ Contractor
Resource Delivery			
Availability of internal resources to deliver project:	○ Red	○ Amber	◉ Green
Availability of external resources to deliver project:	○ Red	○ Amber	◉ Green
Operational Impact			
Outage impact on network system:	○ Red	○ Amber	◉ Green
Procurement Impact			
Procurement impact on network system:	○ Red	○ Amber	◉ Green

1.16 *Key Issues (include mitigation of Red or Amber Resources)*

N/A

1.17 *Climate Change*

Contribution to National Grid's 2050 80% emissions reduction target:	◉ Neutral	○ Positive	○ Negative
Impact on adaptability of network for future climate change:	◉ Neutral	○ Positive	○ Negative

US Sanction Paper

1.18 *List References*

N/A

2 Decisions

I:

(a) APPROVE this paper and the investment of $0.662M and a tolerance of +/-10% for the purposes of Implementation

(b) NOTE the run-the-business (RTB) of $0.016M (per annum) for 5 years.

(c) NOTE that Michelle McNaught is the Portfolio Delivery Manager and has the approved financial delegation.

Signature……..Date…….

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair

3 Sanction Paper Detail

Title:	Nantucket Substation IS Network for Tesla Battery and Solar Micro Turbine	**Sanction Paper #:**	USSC-18-231v2
Project #:	INVP 5178 Capex: S007893	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	3/26/2019
Author:	Anthony Bussard	**Sponsor:**	Carol Sedewitz, VP Distribution Asset Management & Planning
Utility Service:	IT	**Project Manager:**	Anthony Bussard

3.1 *Background*

National Grid has contracted with Tesla Battery Systems for a Battery Energy Storage System (BESS) to be implemented at the Nantucket Bunker Road Substation. Electricity is supplied through underwater cables out to the island. The BESS will help to regulate the energy on the island and well as ensure adequate supply as required. As part of the implementation of these energy systems, the vendor has been contracted to monitor and maintain the battery energy storage system to ensure it is operating as designed. In order to support this monitoring and maintenance, the National Grid IT Corporate Network will need to be extended and connected to this device along with allowing controlled access. This investment covers the IT corporate network portion of the of the larger Nantucket Substation BESS and Micro-Turbine Generator implementation effort.

3.2 *Drivers*

This project is the IT portion of the previously approved Nantucket Bunker Road Substation implementation of a Battery Energy Storage System and Micro-Turbine Generator. This effort is required and will provide IT network and components to enable:

- Secure remote connections to ensure proper operation through remote monitoring & maintenance
- Enable remote monitoring of air quality during operation of Micro-Turbine Generator
- Allow internal network access to devices for contingency purposes
- Ensure the larger project meets it goals and timelines

US Sanction Paper

3.3 *Project Description*

This project covers the planning, design and build of the Corporate IT network to provide secure connections to the Battery Energy Storage System (Tesla Battery) to allow Tesla the ability to securely monitor and maintain the Battery Energy Storage System remotely. Included with this project is a remote connection to a Data Acquisition Handling System (DAHS) provided by Trace Environmental so both Trace and National Grid can monitor and gather air quality data when the Micro-Turbine Generator is operational.

3.4 *Benefits Summary*

Type	Benefit	Description
Direct	Enable secure remote device monitoring	This investment will allow the devices (BESS and Micro-Turbine) to be remotely monitored by the vendors to ensure they are operating within design specification while meeting secure access standards.
Direct	Efficient operation and maintenance of devices	Remote maintenance of the devices will be enabled allowing the vendors to keep their devices running efficiently and apply corrective action as required. Also will enable remote monitoring of air quality during Micro-Turbine Generator Operation.

3.5 *Business and Customer Issues*

There are no significant business issues beyond what has been described elsewhere.

3.6 *Alternatives*

Alternative 1: Do Nothing - Rejected
This option was rejected due to the need to meet the terms of the vendor contracts where the vendor will monitor and maintain the devices to ensure proper operation. Without this investment the vendors would have no way to monitor or maintain the devices remotely while also providing National Grid control of access.

Alternative 2: Delay Investment - Rejected
The contracts with the vendors have been signed and the implementation of the ESS is scheduled for this fiscal year. A delay in the IT portion of the project would jeopardize the much larger project thus driving up costs.

Alternative 3: Install a Third-Submarine Supply Cable – Rejected

US Sanction Paper

As an alternative to installing the BESS and micro-turbine generator, National Grid could have installed a third submarine supply cable to enhance the two existing cables. This option was rejected because it was highly cost prohibitive.

Alternative 4: Select Other Networked Solutions/Providers - Rejected
In discussions of options with the business, vendors, IT Architecture and Digital Risk & Security it was determined that this investment was the most appropriate solution to meet the needs of National Grid's customers because it leverages Verizon services, who already has a competitively priced contract with National Grid.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant issues beyond what has been described elsewhere.

3.8 *Execution Risk Appraisal*

Risk Breakdown Structure Category	Qualitative Assessment / Risk Response Strategy					Risk Score
	Risk ID + Title	IF Statement	THEN Statement	Risk Response Strategy		
1. Vendor Issues	R1 - Installation of Battery System	Installation of the battery system by the vendor is delayed	There will be a delay in the IT project which will impact the timeline and budget	Accept	Conduct bi-weekly meetings with the business to review planning for BESS installation and commissioning. Based on input from these meetings extend/compress the timeline as needed.	4
11. Construction	R2 - Readiness of new control buildings for network buildout	The construction of the new control buildings is delayed	There will be a delay in the IT project which will impact the timeline and budget	Accept	Conduct bi-weekly meetings with the business to review planning for the control building delivery, construction and commissioning. Based on input from these meetings extend/compress the timeline as needed.	4
1. Vendor Issues	R3 - Excessive lead time for the IS network installation	Verizon installation of the extended network circuit and network equipment is delayed	There will be a delay in the IT project which will impact the timeline and budget	Reduce	Conduct weekly meetings with Verizon to ensure lead times are identified and managed. Build in buffers to control lead times and escalate issues early on to reduce impacts.	3

3.9 *Permitting*

N/A

3.10 *Investment Recovery*

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 *Financial Impact to National Grid*

3.11.1 Cost Summary Table

					Current Planning Horizon						
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
Project Number	Project Title	Project Estimate Level (%)	Spend ($M)	Prior Yrs	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	Total
5178	Nantucket IS Network	Est Lvl (e.g. +/- 10%)	CapEx	0.256	0.233	0.000	0.000	0.000	0.000	0.000	0.489
			OpEx	0.091	0.082	0.000	0.000	0.000	0.000	0.000	0.173
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.347	0.315	0.000	0.000	0.000	0.000	0.000	0.662

Total Project Sanction	CapEx	0.256	0.233	0.000	0.000	0.000	0.000	0.000	0.489
	OpEx	0.091	0.082	0.000	0.000	0.000	0.000	0.000	0.173
	Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.347	0.315	0.000	0.000	0.000	0.000	0.000	0.662

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	Total
CapEx	0.256	0.233	0.000	0.000	0.000	0.000	0.000	0.489
OpEx	0.091	0.082	0.000	0.000	0.000	0.000	0.000	0.173
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.347	0.315	0.000	0.000	0.000	0.000	0.000	0.662

US Sanction Paper

Variance (Business Plan-Project Estimate)

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	Total
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

3.11.3 Cost Assumptions

- This investment will be managed by a National Grid Project Manager.
- Project will utilize internal National Grid Resources, external consultants and Verizon technical resources
- Costs of license and services have been confirmed
- The accuracy level of estimate for each project is identified in table 3.11.1

3.11.4 Net Present Value / Cost Benefit Analysis

This is not an NPV Investment

3.11.5 Additional Impacts

N/A

3.12 *Statements of Support*

3.12.1 ***Supporters***

The supporters listed have aligned their part of the business to support the project.

Department	**Individual**	**Responsibilities**
Business Department	John Skrzypczak	Business Representative
Business Partner (BP)	Michael Cowan	Relationship Manager
Program Delivery Management (PDM)	Michelle McNaught	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Peter Shattuck	Manager
Service Delivery	Mark Mirizio	Manager

US Sanction Paper

Enterprise Architecture	Svetlana Lyba	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 *Sanction Request Breakdown by Project*

N/A

Project Cost Breakdown

Project Cost Breakdown $ (millions)					
Cost Category	**sub-category**	**Value of Work to Date (VOWD)**	**Forecast to Complete (FTC)**	**Forecast At Completion (FAC=VOWD+FTC)**	**Name of Firm(s) providing resources**
Personnel	NG Resources	0.089	0.142	0.231	
	SDC Time & Materials		-	-	IBM
			-	-	WiPro
			-	-	DXC
		0.022	0.084	0.105	Verizon
	SDC Fixed-Price		-	-	IBM
			-	-	WiPro
			-	-	DXC
			-	-	Verizon
	All other personnel	0.037	0.131	0.168	
	TOTAL Personnel Costs	**0.148**	**0.356**	**0.505**	
Hardware	Purchase	0.011	-	0.011	
	Lease		0.025	0.025	
Software			-	-	
Risk Margin			0.106	0.106	
AFUDC		0.001	0.011	0.011	
Other			0.004	0.004	
TOTAL Costs		0.160	0.502	0.662	

US Sanction Paper

4.2 *Other Appendices*

N/A

4.3 *NPV Summary*

N/A

4.4 *Customer Outreach Plan*

N/A

4.5 *Benefiting Operating Companies*

This investment will benefit all the companies below.

Benefiting Operating Companies Table:

Operating Company Name	Business Area	State
New England Power Company	Transmission	MA, NH, RI, VT

4.6 *IT Ongoing Operational Costs (RTB):*

This project will increase/decrease IT ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

All figures in $ thousands	Yr. 1 FY 19/20	Yr. 2 FY 20/21	Yr. 3 FY 21/22	Yr. 4 FY 22/23	Yr. 5 FY 23/24	Total
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB	10.0	10.0	10.0	10.0	10.0	**50.0**
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	10.0	10.0	10.0	10.0	10.0	50.0
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB						-
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	**9.3**	**16.0**	**16.0**	**16.0**	**16.0**	**73.1**
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	(9.3)	(16.0)	(16.0)	(16.0)	(16.0)	(73.1)
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-

Closure Paper

Title:	US Field Force Helpdesk	**Sanction Paper #:**	
Project #:	INVP 5186	**Sanction Type:**	Closure
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	1/18/2019
Author:	Neha Verma / Andrew Yee	**Sponsor:**	John Gilbert, Global Head IS Service Delivery
Utility Service:	IT	**Project Manager:**	Andrew Costello

1 Executive Summary

This paper is presented to close INVP 5186. The total spend was $0.603M. The original sanctioned amount for this project was $0.990M at +/- 10%.

2 Project Summary

The project established a co-located team onsite in Syracuse NY, of key partners, DXC, IBM and Verizon to establish a helpdesk consisting of six field agents and six field infrastructure support technicians to resolve issues utilizing the National Grid instance of the Service Now toolset.

The project focused on :-

- IVR (establishing a new dedicated number and workflow for field users)
- Resourcing (Sourcing new capacity that's required for the Service Desk and Field Tech Engineers)
- Knowledge Management and Training (develop the knowledge articles/scripts the agents and techs will use)
- Location Setup (Central Service Desk and Remote Field Locations)
- Inventory / Spare Parts for Field Engineers

3 Variance Analysis

3.1 Cost Summary Table

Project Sanction Summary ($M)				
Title	**Breakdown**	**Total Actual Spend**	**Original Project Sanction Approval**	**Variance (Over) / Under**
Insert Title	**Capex**	0.372	0.000	(0.372)
	Opex	0.231	0.990	0.759
	Removal	0.000	0.000	0.000
	Total	**0.603**	**0.990**	**0.387**

Closure Paper

3.2 Cost Variance Analysis

- This was a critical initiative that required an expedited effort to complete in a short period of time at the direction from senior leadership.
- The teams and vendors were managed very aggressively to stay on schedule and within the scope / costs that was forecasted and managed to.
- Initial estimates included the need for a new telephony system. Fortunately, during execution we were able to re-use the existing telephony system and not assume the forecasted cost for purchase, installation and set-up.

3.3 Schedule Variance Table

Schedule Variance	
Project Grade - Ready for Use Date	**5/30/2018**
Actual Ready for Use Date	**5/22/2018**
Schedule Variance	**- 0 years, 0 months, 8 days**

3.4 Schedule Variance Explanation

Not Applicable

4 Final Cost by Project

Actual Spending ($M) vs. Sanction ($M)				
Project	**Breakdown**	**Total Actual Spend**	**Original Project Sanction Approval**	**Variance (Over) / Under**
Insert Project #	**Capex**	0.372	0.000	(0.372)
	Opex	0.231	0.990	0.759
	Removal	0.000	0.000	0.000
	Total	**0.603**	**0.990**	**0.387**

Actual Spending ($M) vs. Sanction ($M)				
Total	**Breakdown**	**Total Actual Spend**	**Original Project Sanction Approval**	**Variance (Over) / Under**
	Capex	0.372	0.000	(0.372)
	Opex	0.231	0.990	0.759
	Removal	0.000	0.000	0.000
	Total	**0.603**	**0.990**	**0.387**

Closure Paper

5 Improvements / Lessons Learned/Root Cause

1. Establish a Go Live date that is in alignment with the staffing, training and testing needed for a successful go live – 2018-LL-513
2. Lack of clarity on the scope and the interconnections with other teams - 2018-LL-514
3. Communication ownership issues outside the project with Corporate Affairs – 2018-LL-515
4. Work as a team with common goal of project success – Positive 2018-LL-516

6 Closeout Activities

Activity	Completed
All work has been completed in accordance with all National Grid policies	(•) Yes ( ) No
Gate E checklist completed (appl. only to CCD)	( ) Yes (•) N/A
All relevant costs have been charged to project	(•) Yes ( ) No
All work orders and funding projects have been closed	(•) Yes ( ) No
All unused materials have been returned	(•) Yes ( ) No
All IT Service Transition activities have been completed	(•) Yes ( ) No
All lessons learned have been entered appropriately into the IT Knowledge Management Tool (KMT) lesson learned database	(•) Yes ( ) No

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Ryan Shooshan	Business Representative
Program Delivery ManagementPDM	Helen Smith	Head of PDM
Business Partner (BP)	Brian Detota	Relationship Manager
Program Delivery Management (PDM)	Douglas Campbell	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Tom Gill	Director
Digital Risk and Security (DR&S)	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

7.2 Reviewers

Not applicable

Closure Paper

8 Decisions

The US ISSC Sanctioning Committee and Executive Sponsor has reviewed and approved this paper.

Signature……..Date…….

Premjith Singh
VP IT Tower Lead – Gas Business Partner

US Sanction Paper

Title:	AIX Upgrade	**Sanction Paper #:**	USSC-18-108_V2
Project #:	INVP 5199 Capex: S007804	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	10/16/2018
Author:	Aravind Lochan / Andrew Yee	**Sponsor:**	Barry Sheils, Vice President of Infrastructure and Operations
Utility Service:	IT	**Project Manager:**	Ken Little

1 Executive Summary

1.1 *Sanctioning Summary*

This paper requests full sanction of INVP 5199 in the amount of $2.208M with a tolerance of +/- 10% for the purposes of Full Implementation for the AIX (Advanced Interactive executive) Upgrade project.

This sanction amount is $2.208M broken down into:

$2.079M Capex
$0.129M Opex
$0.000M Removal

1.2 *Project Summary*

The scope of this project is to purchase, configure and implement new AIX infrastructure to replace legacy AIX infrastructure that hosts business applications in the Newark DXC datacenter. This project will also analyze the current application estate hosted on the legacy AIX environment in the Newark DXC datacenter and migrate to the new AIX platform located in the Newark DXC datacenter. The current legacy AIX infrastructure does not have the capability to support high availability (systems which are durable and minimize hardware failures) and redundancy of server hardware components. Without high availability capabilities, AIX hosted applications may fail in the event of an infrastructure failure increasing the risk of application outages. A new AIX infrastructure is required to support improved resiliency and failover capabilities.

This paper requests sanction for the purchase and installation of AIX servers, network switches, cabling, power and the migration of AIX hosted production applications to the new AIX infrastructure located in the Newark DXC data center. The new AIX servers will provide a level of resiliency that will allow for high availability of production hosted virtual servers and applications. This project will also perform the analysis of existing AIX hosted applications and migrate the applications to the new AIX servers and infrastructure.

The project scope includes:

- Purchase and installation of AIX server hardware in the Newark DXC datacenter
- Purchase and installation of network equipment related to the new AIX infrastructure
- Purchase of network cabling and power installation services for the AIX infrastructure
- Analysis of applications hosted on the current AIX infrastructure
- Migration of applications to the new AIX infrastructure

1.3 *Summary of Projects*

Project Number	Project Title	Estimate Amount ($M)
5199	AIX Upgrade Project	$2.208M

1.4 *Associated Projects*

N/A

1.5 *Prior Sanctioning History*

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
2/13/18	USSC	$1.638M	$2.569M	Partial	+/-10%

1.6 *Next Planned Sanction Review*

Date (Month/Year)	Purpose of Sanction Review
June 2019	Project Closure Sanction

US Sanction Paper

1.7 *Category*

Category	Reference to Mandate, Policy, NPV, or Other
○ Mandatory ○ Policy- Driven ○ Justified NPV ◉ Other	This project will upgrade and improve National Grid's AIX infrastructure platform. This investment will improve resiliency and availability of hosted business applications that reside on the AIX infrastructure.

1.8 *Asset Management Risk Score*

Asset Management Risk Score: 44

Primary Risk Score Driver: (Policy Driven Projects Only)

◉ Reliability ○ Environment ○ Health & Safety ○ Not Policy Driven

1.9 *Complexity Level*

○ High Complexity ◉ Medium Complexity ○ Low Complexity ○ N/A

Complexity Score: 20

1.10 *Process Hazard Assessment*

A Process Hazard Assessment (PHA) is required for this project:

○ Yes ◉ No

US Sanction Paper

1.11 *Business Plan*

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan ($)
IT Investment Plan FY19-23	◉ Yes ○ No	○ Over ◉ Under ○ NA	$0.090M

1.12 *If cost > approved Business Plan how will this be funded?*

N/A

1.13 *Current Planning Horizon*

$M	Prior Yrs	Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	Total
CapEx	1.356	0.679	0.044	0.000	0.000	0.000	0.000	2.079
OpEx	0.011	0.111	0.007	0.000	0.000	0.000	0.000	0.129
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	1.367	0.790	0.051	0.000	0.000	0.000	0.000	2.208

1.14 *Key Milestones*

Milestone	Target Date: (Month Year)
Start Up	January 2018
Partial Sanction	February 2018
Begin Requirements and Design	April 2018
Project Sanction (Full Sanction)	October 2018
Begin Development and Implementation	October 2018
Move to Production / Last Go Live	April 2019
Project Closure	June 2019

US Sanction Paper

1.15 *Resources, Operations and Procurement*

Resource Sourcing			
Engineering & Design Resources to be provided	☑ Internal		☑ Contractor
Construction/Implementation Resources to be provided	☑ Internal		☑ Contractor
Resource Delivery			
Availability of internal resources to deliver project:	○ Red	○ Amber	◉ Green
Availability of external resources to deliver project:	○ Red	○ Amber	◉ Green
Operational Impact			
Outage impact on network system:	○ Red	○ Amber	◉ Green
Procurement Impact			
Procurement impact on network system:	○ Red	○ Amber	◉ Green

1.16 *Key Issues (include mitigation of Red or Amber Resources)*

N/A

1.17 *Climate Change*

Contribution to National Grid's 2050 80% emissions reduction target:	◉ Neutral	○ Positive	○ Negative
Impact on adaptability of network for future climate change:	◉ Neutral	○ Positive	○ Negative

1.18 *List References*

N/A

2 Decisions

I:

(a) APPROVE this paper and the investment of $2.208M and a tolerance of +/-10% for the purposes of Development and Implementation.

(b) NOTE that Ken Little is the Project Manager and has the approved financial delegation.

Signature……..Date…….

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair

3 Sanction Paper Detail

Title:	AIX Upgrade	**Sanction Paper #:**	USSC-18-108_V2
Project #:	INVP 5199 Capex: S007804	**Sanction Type:**	Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	10/16/2018
Author:	Aravind Lochan / Andrew Yee	**Sponsor:**	Barry Sheils Vice President of Infrastructure and Operations
Utility Service:	IT	**Project Manager:**	Ken Little

3.1 *Background*

The current legacy AIX infrastructure that hosts virtual servers and business applications located in the Newark DXC datacenter does not readily provide resiliency for hosted virtual servers and applications. The new AIX infrastructure will provide resiliency, increased performance and availability for hosted virtual servers and applications.
The new AIX servers will reduce the potential of a hardware failure causing virtual server and application outages reducing risk to our business. Existing applications will be analyzed and migrated to the new AIX platform.

3.2 *Drivers*

- The current legacy server hardware does not have the capability to support high availability (systems which are durable and minimize hardware failures) failover in the event of a hardware failure for hosted virtual servers or applications
- Improve hardware resiliency and application availability with new AIX infrastructure
- Provide improved performance and supportability for AIX hosted virtual servers and applications with new server hardware
- Supports the modernization of National Grid's AIX infrastructure

3.3 *Project Description*

This paper requests sanction for the purchase and installation of AIX servers, network switches, cabling and power in the DXC Newark data center. The new AIX servers will provide a level of resiliency that will allow for high availability of production hosted virtual servers and applications.

This project will also perform the analysis of existing AIX hosted applications and migrate the applications to the new AIX servers and infrastructure.

3.4 *Benefits Summary*

Qualitative Benefits

- Business applications hosted on supported and modern AIX infrastructure
  - Upgrading the AIX infrastructure in the DXC Newark datacenter supports high availability and reduces the risk of potential hardware failure
- Improved resiliency, reliability and performance
  - Upgraded AIX infrastructure provides a robust environment for reducing outages and increased performance for hosted applications

3.5 *Business and Customer Issues*

There are no significant issues beyond what has been described elsewhere in this paper.

3.6 *Alternatives*

Alternative 1: Do Nothing - Not selected. This option does not address the need to reduce application outages for the business.

Alternative 2: Defer investment – Not selected. Does not mitigate the risk from running applications on legacy AIX infrastructure. Deferring the investment does not support the modernization of National Grid's AIX infrastructure.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant issues beyond what has been described elsewhere.

3.8 *Execution Risk Appraisal*

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	The schedule of application migrations are subject to coordintation with business application owners and their approval for migration dates	3	2	3	6	9	Mitigate	Manage business expectations	Project schedule may be at risk	Work closely with the respective business application owners to plan and schedule application migrations.
2	Work stoppage may limit the days that Gas Business related application can be migrated.	4	2	3	8	12	Mitigate	Manage business expectations	Project schedule may be at risk	Monitor the work stoppage status throughout the project.Work closely with the respective business application owners to plan and schedule application migrations.
3	Project timeline will be negatively impacted if there are delays completing the sanctioning process	2	2	2	4	4	Mitigate	Engage early with sanction stakeholders and follow up.	Project schedule may be at risk	Momitor the progress of the sanction workflows and approvals.

3.9 *Permitting*

N/A

3.10 *Investment Recovery*

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

US Sanction Paper

3.10.3 CIAC / Reimbursement

N/A

3.11 *Financial Impact to National Grid*

3.11.1 Cost Summary Table

					Current Planning Horizon						
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
Project Number	Project Title	Project Estimate Level (%)	Spend ($M)	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
5199	AIX Upgrade	+/- 10%	CapEx	1.356	0.679	0.044	0.000	0.000	0.000	0.000	2.079
			OpEx	0.011	0.111	0.007	0.000	0.000	0.000	0.000	0.129
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	1.367	0.790	0.051	0.000	0.000	0.000	0.000	2.208

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	1.356	0.866	0.000	0.000	0.000	0.000	0.000	2.222
OpEx	0.011	0.065	0.000	0.000	0.000	0.000	0.000	0.076
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	1.367	0.931	0.000	0.000	0.000	0.000	0.000	2.298

Variance (Business Plan-Project Estimate)

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
CapEx	0.000	0.187	(0.044)	0.000	0.000	0.000	0.000	0.143
OpEx	0.000	(0.046)	(0.007)	0.000	0.000	0.000	0.000	(0.053)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.141	(0.051)	0.000	0.000	0.000	0.000	0.090

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the Standard IT Estimating Methodology. The accuracy level of estimate for each project is identified in Table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

N/A

3.11.4.1 *NPV Summary Table*

N/A

3.11.4.2 *NPV Assumptions and Calculations*

N/A

3.11.5 Additional Impacts

N/A

3.12 *Statements of Support*

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Barry Sheils	Business Representative
PDM	Helen Smith	Head of PDM
BRM	Brian Detota	Relationship Manager
PDM	Chris Granata	Program Delivery Director
IT Finance	Michelle Harris	Director
IT Regulatory	Dan DeMauro	Director
DR&S	Elaine Wison	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Svetlana Lyba	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John

Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 *Sanction Request Breakdown by Project*

N/A

4.2 *Other Appendices*

4.2.1 Project Cost Breakdown

Project Cost Breakdown $ (millions)					
Cost Category	**sub-category**	**Value of Work to Date (VOWD)**	**Forecast to Complete (FTC)**	**Forecast At Completion (FAC=VOWD+FTC)**	**Name of Firm(s) providing resources**
Personnel	NG Resources	0.101	0.122	0.223	
	SDC Time & Materials	0.000	0.091	0.091	IBM
		0.011	0.003	0.014	WiPro
		0.092	0.078	0.170	DXC
		0.000	-	-	Verizon
	SDC Fixed-Price	0.000	-	-	IBM
		0.000	0.123	0.123	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	All other personnel	0.000	-	-	
	TOTAL Personnel Costs	**0.203**	**0.417**	**0.620**	
Hardware	Purchase	1.426	-	1.426	
	Lease	0.000	-	-	
Software		0.000	-	-	
Risk Margin			-	-	
AFUDC		0.050	0.105	0.155	
Other		0.001	0.006	0.007	
TOTAL Costs		1.680	0.528	2.208	

4.2.2 Benefiting Operating Companies

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Narragansett Electric Company	Electric Distribution	RI
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
New England Power Company – Transmission	Transmission	MA, NH, RI, VT
KeySpan Generation LLC (PSA)	Generation	NY
Narragansett Gas Company	Gas Distribution	RI
Colonial Gas Company	Gas Distribution	MA
Narragansett Electric Company – Transmission	Transmission	RI
National Grid USA Parent	Parent	
Nantucket Electric Company	Electric Distribution	MA
NE Hydro - Trans Electric Co.	Inter Connector	MA, NH
New England Hydro Finance Company Inc.	Inter Connector	MA, NH
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Port Jefferson Energy Center	Generation	NY
New England Hydro - Trans Corp.	Inter Connector	MA, NH
KeySpan Services Inc.	Service Company	
KeySpan Glenwood Energy Center	Generation	NY
Massachusetts Electric Company – Transmission	Transmission	MA
NG LNG LP Regulated Entity	Gas Distribution	MA, NY, RI
Transgas Inc	Non-Regulated	NY
Keyspan Energy Trading Services	Other	NY
KeySpan Energy Corp.	Service Company	
New England Electric Trans Corp	Inter Connector	MA

4.2.3 IT Ongoing Operational Costs (RTB):

There is no impact to RTB as a result of this project.

4.3 *NPV Summary (if applicable)*

N/A

4.4 *Customer Outreach Plan*

N/A

US Sanction Paper

Title:	AIX Upgrade	**Sanction Paper #:**	USSC-18-108
Project #:	INVP 5199 Capex: S007804	**Sanction Type:**	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	February 13, 2018
Author:	Aravind Lochan / Andrew Yee	**Sponsor:**	John Gilbert Global Head IS Service Delivery
Utility Service:	IS	**Project Manager:**	Ken Little

1 Executive Summary

1.1 Sanctioning Summary

This paper requests partial sanction of INVP 5199 in the amount $1.638M with a tolerance of +/- 10% for the purposes of for AIX (Advanced Interactive eXecutive) Upgrade project.

This sanction amount is $1.638M broken down into:

$1.618M Capex
$0.020M Opex
$0.000M Removal

NOTE the potential investment of $2.569M with a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of requirements and design.

1.2 Project Summary

The scope of this project is to purchase, configure and implement new AIX infrastructure to replace legacy AIX infrastructure. This project will also analyze the current application estate hosted on the legacy AIX environment and migrate them to the new AIX platform. The current legacy AIX infrastructure does not have the capability to support high availability and redundancy of server hardware components. Without high availability capabilities, AIX hosted applications may fail in the event of an infrastructure failure increasing the risk of application outages. A new AIX infrastructure is required to support improved resiliency (seamless operation of AIX hosted applications) and failover capabilities.

This paper requests sanction for the purchase and installation of AIX servers, network switches, cabling and power in DXC data centers. The new AIX servers will provide a level of resiliency that will allow for high availability (systems which are durable and

mimize hardware failures) of production hosted virtual servers and applications. This project will also perform the analysis of existing AIX hosted applications and migrate the applications to the new AIX servers and infrastructure.

The project scope includes:

- Purchase and installation of AIX server hardware
- Analysis of applications hosted on the current AIX infrastructure
- Migration of applications to the new AIX infrastructure
- Purchase and installation of network equipment related to the new AIX infrastructure
- Purchase of network cabling and power installation services for the AIX infrastructure
- Configuration of storage related to the new AIX infrastructure

1.3 Summary of Projects

Project Number	Project Title	Estimate Amount ($M)
5199	AIX Upgrade Project	2.569

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
May 2018	Project Sanction

US Sanction Paper

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
○ Mandatory ◉ Policy- Driven ○ Justified NPV ○ Other	This Growth Playbook Project will upgrade and improve National Grid's AIX infrastructure platform. This investment will improve resiliency of the AIX infrastructure.

1.8 Asset Management Risk Score

Asset Management Risk Score: 44

Primary Risk Score Driver: (Policy Driven Projects Only)

○ Reliability ○ Environment ○ Health & Safety ◉ Not Policy Driven

1.9 Complexity Level

○ High Complexity ○ Medium Complexity ◉ Low Complexity ○ N/A

Complexity Score: 17

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

○ Yes ◉ No

US Sanction Paper

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan ($)
IS Investment Plan FY18 - 22	○ Yes ◉ No	◉ Over ○ Under ○ NA	$2.569 M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IS business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 Current Planning Horizon

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	Prior Yrs	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total
CapEx	0.000	1.618	0.866	0.000	0.000	0.000	0.000	2.484
OpEx	0.000	0.020	0.065	0.000	0.000	0.000	0.000	0.085
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	1.638	0.931	0.000	0.000	0.000	0.000	2.569

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Jan 2018
Partial Sanction	Feb 2018
Begin Requirements and Design	Mar 2018
Project Sanction	May 2018
Begin Development and Implementation	Jun 2018
Move to Production / Last Go Live	Oct 2018
Project Complete	Oct 2018
Sanction Closure	Nov 2018

US Sanction Paper

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	☑ Internal		☑ Contractor
Construction/Implementation Resources to be provided	☑ Internal		☑ Contractor
Resource Delivery			
Availability of internal resources to deliver project:	○ Red	○ Amber	◉ Green
Availability of external resources to deliver project:	○ Red	○ Amber	◉ Green
Operational Impact			
Outage impact on network system:	○ Red	○ Amber	◉ Green
Procurement Impact			
Procurement impact on network system:	○ Red	○ Amber	◉ Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	◉ Neutral	○ Positive	○ Negative
Impact on adaptability of network for future climate change:	◉ Neutral	○ Positive	○ Negative

1.18 List References

N/A

2 Decisions

I:

(a) APPROVED the investment of $1.638M and a tolerance of +/- 10% for the purposes of purchasing hardware.

(b) NOTED the potential investment of $2.569M and a tolerance of +/- 25% contingent upon submittal and approval of a Project Sanction paper following completion of Requirements and Design.

(c) NOTED that Ken Little has the approved financial delegation to undertake the activities stated in (a).

Signature……..Date…….

David H. Campbell, Vice President, ServCo Business Partnering, USSC Chair

3 Sanction Paper Detail

Title:	AIX Upgrade	**Sanction Paper #:**	USSC-18-108
Project #:	INVP 5199 Capex: S007804	**Sanction Type:**	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	**Date of Request:**	February 13, 2018
Author:	Aravind Lochan / Andrew Yee	**Sponsor:**	John Gilbert Global Head IS Service Delivery
Utility Service:	IS	**Project Manager:**	Ken Little

3.1 Background

The current legacy AIX infrastructure does not readily provide resiliency for hosted virtual servers and applications. The new AIX infrastructure will provide resiliency, increased performance and availability for hosted virtual servers and applications. The new AIX servers will reduce the potential of a hardware failure causing virtual server and application outages reducing risk to our business. Existing applications will be analyzed and migrated to the new AIX platform

3.2 Drivers

- The current legacy server hardware does not have the capability to support high availability failover in the event of a hardware failure for hosted virtual servers or applications
- Improve hardware resiliency and application availability with new AIX infrastructure
- Provide improved performance and supportability for AIX hosted virtual servers and applications with new server hardware
- Supports the modernization of National Grid's AIX infrastructure

3.3 Project Description

This paper requests sanction for the purchase and installation of AIX servers, network switches, cabling and power in DXC data centers. The new AIX servers will provide a level of resiliency that will allow for high availability of production hosted virtual servers and applications.

This project will also perform the analysis of existing AIX hosted applications and migrate the applications to the new AIX servers and infrastructure.

3.4 Benefits Summary

Qualitative Benefits-

- Business applications hosted on supported and modern AIX infrastructure
  - Upgrading the AIX infrastructure in DXC data centers supports high availability and reduces the risk of potential hardware failure
- Improved resiliency, reliability and performance
  - Upgraded AIX infrastructure provides a robust environment for reducing outages and increased performance for hosted applications

3.5 Business and Customer Issues

There are no significant issues beyond what has been described elsewhere as the project scope is to purchase hardware.

3.6 Alternatives

Alternative 1: Do Nothing - Not selected. This option does not address the need to reduce application outages for the business.

Alternative 2: Defer investment – Not selected. Does not mitigate the risk from running applications on legacy AIX infrastructure.

3.7 Safety, Environmental and Project Planning Issues

There are no significant issues beyond what has been described elsewhere.

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	DXC are able to provide accurate technical requirements for new servers that will support the applications in the target area	2	2	5	4	10	Mitigate	DXC performed a high level analysis of existing application hosted on the AIX infrastructure.	Project solution might be at risk.	Review of hosted applications to be be reviewed during the analysis perfromed during the project.
2	DXC may not be able to procure the hardware on time	3	3	3	9	9	Mitigate	Have all the detailed requirements from DXC, and set the expectation with DXC on the forthcoming challenges.	Project timeline at risk.	Ensure the requirements are detailed beforehand before proceeding to different phase of project life cycle and procurement period.
3	The schedule of application migrations are subject to coordintation with business application owners and their approval for migration dates	3	2	3	6	9	Mitigate	Manage business expectations	Project schedule may be at risk	Work closely with the respective business application owners to paln and schedule application migrations

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon						
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
Project Number	Project Title	Project Estimate Level (%)	Spend ($M)	Prior Yrs	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total
5199	AIX Upgrade Project	Est Lvl (e.g. +/- 10%)	CapEx	0.000	1.618	0.866	0.000	0.000	0.000	0.000	2.484
			OpEx	0.000	0.020	0.065	0.000	0.000	0.000	0.000	0.085
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.638	0.931	0.000	0.000	0.000	0.000	2.569

Total Project Sanction	CapEx	0.000	1.618	0.866	0.000	0.000	0.000	0.000	2.484
	OpEx	0.000	0.020	0.065	0.000	0.000	0.000	0.000	0.085
	Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.000	1.638	0.931	0.000	0.000	0.000	0.000	2.569

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Variance (Business Plan-Project Estimate)

		Current Planning Horizon						
	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
$M	(Actual)	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total
CapEx	0.000	(1.618)	(0.866)	0.000	0.000	0.000	0.000	(2.484)
OpEx	0.000	(0.020)	(0.065)	0.000	0.000	0.000	0.000	(0.085)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(1.638)	(0.931)	0.000	0.000	0.000	0.000	(2.569)

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the Standard IS Estimating Methodology. The accuracy level of estimate for each project is identified in Table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

N/A

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Role	Individual
Business Representative	N/A
Head of PDM	Helen Smith
Relationship Manager	Brian Detota
Program Delivery Director	Chris Granata
IS Finance Management	Michelle Harris
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Mark Mirizio
Enterprise Architecture	Don Rera

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual	Area
Regulatory	Harvey, Maria	IS
Jurisdictional Delegate(s)	Anand, Sonny	Electric - NE
	Harbaugh, Mark	Electric - NY
	Hill, Terron	FERC
	Currie, John	Gas - NE
	Wolf, Don	Gas - NY
Procurement	Chevere, Diego	All

4 Appendices

4.1 Appendices

4.1.1 Project Cost Breakdown

Project Cost Breakdown $ (millions)					
Cost Category	**sub-category**	**VOWD**	**FTC**	**FAC=VOWD+FTC**	**Name of Firm(s) providing**
Personnel	NG Resources	0	0.119	0.119	
	SDC Time & Materials	0	-	-	IBM
		0	0.011	0.011	WiPro
		0	-	-	DXC
		0	-	-	Verizon
	SDC Fixed-Price	0	-	-	IBM
		0	-	-	WiPro
		0	-	-	DXC
		0	-	-	Verizon
	All other personnel	0	-	-	
	TOTAL Personnel Costs	**0**	0.130	0.130	
Hardware	Purchase	0	1.775	1.775	
	Lease	0	-	-	
Software		0	0.499	0.499	
Risk Margin			-	-	
AFUDC		0	0.109	0.109	
Other		0	0.055	0.055	
	TOTAL Costs	-	2.569	2.569	Should match Financial Summary Total

4.1.2 Vendor Cost Breakdown

Vendor	$ millions
IBM	0.250
WiPro	0.260
DXC	1.775

4.1.3 IS Ongoing Operational Costs (RTB)

RTB impacts will be determined during R&D Phase

4.1.4 Benefiting Operating Companies

Benefiting Operating Companies Table:

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Narragansett Electric Company	Electric Distribution	RI
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
New England Power Company – Transmission	Transmission	MA, NH, RI, VT
KeySpan Generation LLC (PSA)	Generation	NY
Narragansett Gas Company	Gas Distribution	RI
Colonial Gas Company	Gas Distribution	MA
Narragansett Electric Company – Transmission	Transmission	RI
National Grid USA Parent	Parent	
Nantucket Electric Company	Electric Distribution	MA
NE Hydro - Trans Electric Co.	Inter Connector	MA, NH
New England Hydro Finance Company Inc.	Inter Connector	MA, NH
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Port Jefferson Energy Center	Generation	NY
New England Hydro - Trans Corp.	Inter Connector	MA, NH
KeySpan Services Inc.	Service Company	
KeySpan Glenwood Energy Center	Generation	NY
Massachusetts Electric Company – Transmission	Transmission	MA
NG LNG LP Regulated Entity	Gas Distribution	MA, NY, RI
Transgas Inc	Non-Regulated	NY
Keyspan Energy Trading Services	Other	NY
KeySpan Energy Corp.	Service Company	
New England Electric Trans Corp	Inter Connector	MA

nationalgrid

Closure: US Sanction Paper

Title:	AIX Upgrade	Sanction Paper #:	USSC-18-108 C
Project #:	INVP 5199	Sanction Type:	Closure
Capex #:	S007804		
Operating Company:	National Grid USA Svc. Co.	Date of Request:	7/30/2019
Author:	Little, Ken	Sponsor(s):	Olive, Stephen Chief Information Officer
Utility Service:	IT	Project Manager:	Little, Ken

Executive Summary

This paper is presented to close INVP 5199. The total spend was $2.167M. The original sanctioned amount for this project was $2.208M at +/- 10%.

Project Summary

The project purchased, configured and implemented new AIX (Advanced Interactive eXecutive) infrastructure to replace legacy AIX infrastructure that hosts business applications in the Newark DXC datacenter. This project analyzed the current application estate hosted on the legacy AIX environment in the Newark DXC datacenter and successfully migrated applications to the new AIX platform. The legacy AIX infrastructure does not have the capability to support high availability (systems which are durable and minimize hardware failures) and redundancy of server hardware components.

Schedule Variance Table

	Schedule Variance
Project Grade - Ready to use Date	4/30/2019
Actual Ready to use Date	5/17/2019
Schedule Variance	0 year(s), 0 month(s), 17 day(s)

Cost Summary Table

Project Sanction Summary ($M)

Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Capex	2.048	2.079	0.031
Opex	0.119	0.129	0.010
Removal			

		0.000	0.000	0.000
	Total	2.167	2.208	0.041

Cost Variance Analysis

Expected vendor capex costs for migration activities were reduced through the use of Live Partition Mobility for migrations of AIX instances to the new AIX hardware resulting in an underspend of 0.031 M in Capex. This reduced the downtime needed for the migration of AIX instances and hosted application to the new AIX hardware.

Final Cost by Project

Actual Spending ($M) vs. Sanction ($M)

Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
	Capex	2.048	2.079	0.031
	Opex	0.119	0.129	0.010
	Removal	0.000	0.000	0.000
	Total	2.167	2.208	0.041

Project Sanction Summary ($M)

	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Total	Capex	2.048	2.079	0.031
	Opex	0.119	0.129	0.010
	Removal	0.000	0.000	0.000
	Total	2.167	2.208	0.041

Improvements / Lessons Learned

2019-LL-717

The use of LPM (Live Partition Mobility) was investigated and tested for migrations of AIX instances. LPM and can also be used for BAU operation of the P8 AIX environment to move workloads between AIX frames.

Closeout Activities

ACTIVITY	COMPLETED
All work has been completed in accordance with all National Grid policies	◉ Yes ○ No
Gate E checklist completed (appl. only to CCD)	○ Yes ◉ N/A
All relevant costs have been charged to project	◉ Yes ○ No
All work orders and funding projects have been closed	◉ Yes ○ No
All unused material have been returned	◉ Yes ○ No
All as-builts have been completed	◉ Yes ○ No
All lessons learned have been entered appropriately into the lesson learned database	◉ Yes ○ No

Statement of Support

Department	Individual	Responsibilities

Business Department	Maxwell, Steve	Business Representative
Business Partner (BP)	Davidson, Caitlin	Relationship Manager
Program Delivery Management (PDM)	Granata, Chris	Program Delivery Director
IT Finance	Harris, Michelle	Manager
IT Regulatory	DeMauro, Daniel J.	Director
Digital Risk and Security (DR&S)	Wilson, Elaine	Director
Service Delivery	Mirizio, Mark	Manager
Enterprise Architecture	Lyba, Svetlana	Director
Enterprise Portfolio Management	Cronin, Daniel	Analyst

Reviewers

Function	*Individual*
Regulatory	Mancinelli, Lauri A.
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Smith, Amy
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

Decisions

I approve this paper.

Signature _____

Date 8/5/19

David H. Campbell, Vice President US Treasury, USSC Chair

Appendix

N/A